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Psychological Bulletin

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THE PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE MEETING OF THE SOUTHERN SOCIETY FOR PHILOSOPHY AND PSYCHOLOGY, APRIL 19, 1930, AT GEORGE PEABODY COLLEGE FOR TEACHERS, NASHVILLE, TENNESSEE.

REPORT OF THE SECRETARY, PAUL L. BOYNTON, GEORGE PEABODY COLLEGE FOR TEACHERS

Minutes of Business Meeting

The annual business meeting of the Society was held Saturday morning at 9 o'clock at the Jessup Psychological Laboratory, George Peabody College for Teachers, President Meyer presiding. J. B. Miner was appointed secretary *pro tem.*

The minutes of the 1929 meeting were read and approved. The treasurer's report, showing $186.61 on hand, audited by Council, was approved.

The Council recommended that Art. III, Sec. 2, of the constitution be amended to read: "Art. III, Sec. 2. There shall be a Council composed of nine members, including the officers who shall be *ex-officio* members of the Council; six elected members who shall be elected annually, each for a term of three years; and the retiring president who shall continue as a member of the Council for one year after his term as president."

That Art. IV, Sec. 4, be changed to read: "The Council shall have power to supervise the program of the meetings and to delegate this power."

Under the constitution these amendments lie over for action until the next meeting.

The secretary was instructed to send a mimeographed copy of the present constitution and by-laws, if any, to the members together with the proposed amendments.

The Council nominated the following for membership and they were duly elected:

Dr. Scott Buchanan, Associate Professor of Philosophy, University of Virginia.

Dr. Charles K. Davenport, Assistant Professor of Philosophy, University of Virginia.

Dr. F. A. Geldard, of the Psychology Department of the University of Virginia.

Dr. Roland C. Davis, Research Associate in Psychology, University of Virginia.

Dr. Frank Pattie, Professor of Psychology, Rice Institute.

Dr. Anna Matheson, Professor of Psychology, Goucher College.

Professor John Kuiper, Department of Philosophy, University of Kentucky.

Dr. Joseph B. Rhein, Department of Psychology, Duke University.

Dr. J. E. W. Wallin, Director of the Division of Special Education, Baltimore.

The secretary was directed to notify the new members of their election and that their dues should begin with the next fiscal year, starting October 1, 1930.

The secretary was directed to send a list of the members of the Society in good standing to each of the members.

The Council announced that invitations for the next meeting had been received from Johns Hopkins and from the University of Virginia; and from the Florida State College for Women for the following year. It was recommended that the 1931 meeting be held on the Friday and Saturday before Easter at the University of Virginia. The recommendation was adopted.

In view of the proposed change in the constitution, the Council recommended that Max F. Meyer, the retiring president, be elected to the Council for one year. Adopted.

In view of the discussions in the Council and Society as to nominations for the office of president and for two members of the Council, Mr. Miner moved that this year all nominations for these offices be made from the floor. The motion prevailed.

H. M. Johnson, P. F. Finner, and Ethel Bowman were nominated for president.

It was moved and carried that a majority of those voting be declared necessary for election of president, and, if necessary, the second ballot be taken for the two highest. On the first ballot the

vote was as follows: Johnson, 11; Bowman, 9; Finner, 6. On the second ballot Bowman received 13 votes, Johnson 10, and Doctor Bowman was declared elected.

For the Council the following were nominated: H. M. Johnson, R. M. Dorcus, J. A. McGeoch, A. F. Liddell.

It was moved and carried that the two receiving the highest number of votes be declared elected.

The vote stood as follows: Johnson, 23; Dorcus, 16; McGeoch, 11; Liddell, 1. Doctor Liddell is already a member of the Council.

Doctor Johnson and Doctor Dorcus were declared elected.

Doctor Sanborn read a report from the Committee on the Teaching of Philosophy in Southern Colleges, in the absence of its Chairman, Doctor Lovejoy, who prepared the report. It indicated that two efforts to secure information from southern colleges had brought so few replies that the Committee did not feel justified in presenting a tabulation. It awaited further instructions. On motion, the Committee's report was received and filed and the Committee advised to proceed further at its discretion.

Doctor Joseph Peterson reported a tentative approved list of courses in psychology in southern colleges for the current year, as found by the standing Committee on the Teaching of Psychology in Southern Colleges.

The Society voted to send to Mrs. Buchner a copy of the paper on "Our Twenty-fifth Anniversary" by J. B. Miner, which included a recognition of the work of the late Professor Edward Franklin Buchner, of Johns Hopkins, as founder of the Society in 1904.

A vote of thanks was extended to George Peabody College for Teachers, Vanderbilt University, and their local representatives as hosts of the Society.

J. B. MINER
Secretary pro tem.

PROGRAM

Some Uses of the Results of Freshman Psychological Tests. JASPER C. BARNES, Maryville College.

A Study of Eyedness and Handedness. NOEL B. CUFF, Eastern Kentucky Teachers' College.

The study was conducted with three main aims in view: first, to analyze the general meaning of the term eyedness; second, to analyze the meaning of the term handedness; third, to investigate the relation of eyedness to handedness.

Tests were given to 237 children, grades 1–8, and to 109 college students; total number of tests, 4,152. The tests were used in the order listed:

A1. Manoptometer.
B1. Throwing as an index of unimanual preference.
2. Use of the hands in batting. The test used by Rife.
3. Use of the hands in sweeping. The test used by Rife.
4. Hand behavior in receiving an object.
5. Easy reaching.
6. Energetic reaching.
7. Dominant thumb when hands are clasped with fingers alternating.
8. The foot used for kicking.
C. Hand used in writing.
A2. Unilateral winking.
A1. Manoptometer.

The manoptometer was derived after a study of the criticisms of Parson's manoptoscope. It yields quantitative results and has reliability coefficients of .98, .98, and .97 in grades 1, 2 and 3, respectively.

Subjects who performed four activities—writing, throwing, easy reaching, and energetic reaching with the right hand—or a majority of the B1–8 activities with the right hand are designated right-handed. All eight activities were used in analyzing the term handedness and in correlating handedness with eyedness.

Data presented show:

1. Eyedness is not a form of behavior which can be adequately described by general terms, such as right-eyed or left-eyed. The unilateral sighting preference may be much stronger for one individual than it is for another.

2. Two groups of eyedness exist in addition to right- and left-eyed. These are (1) unstable-eyed and (2) equal-eyed.

3. Handedness is a general term used to indicate a number of rather specific types of activities and is not adequately described by right and left.

4. Most persons who belong to the broad type of handedness roughly described as right-handed tend to use the right hand for throwing, receiving, and reaching, and the right foot for kicking. They may differ widely, however, on other hand activities.

5. The manoptometer shows that from 20 to 30 per cent are probably natively left-handed.

6. The validity of the test is indicated by the facts (1) 100 per cent of the right-eyed children found in this study are right-handed according to the handedness scale, and (2) all of the left-handed are left-eyed except one case; that one is equal-eyed.

7. The scale of handedness shows that 93.6 per cent of the children and 92.7 per cent of the college students are now right-handed.

8. Crossed dextrals show sinistral tendencies, but one can also state that some dextrals show sinistral tendencies—a person may throw, bat, and sight dextrally and sweep left-handed.

9. The correlations between eyedness and handedness are apparently low, with the exception of the first grade r of .81, the range is from —.08 to .40.

The Effect of Change of Work on the Work Decrement. KATHERINE VICKERY, Alabama College.

Eighty subjects divided into four equated groups worked on cancellation and equation tests for twenty minutes per day for five days. One group worked continuously on the cancellation test, one continuously on the equation test. The other two groups changed work from one test to the other every five minutes. No decrement developed from continuous work on the cancellation test, but a decided decrement was produced by continuous work on the equation test. Change of work lessened the decrement incurred by continuous work. There is considerable probability that change of work is effective in reducing the work decrement in more complex types of mental activity; simpler types of activity do not appear to be as susceptible to decrement under conditions of continuous work.

Some Measures of "Attention." HOWARD EASLEY, George Peabody College for Teachers.

The current measures of attention are based on assumptions which have not been subjected to sufficient critical examination to insure that attention is really measured, or that the attention involved in one function is the same as that involved in another. In this study an attempt was made to answer these questions relative to certain selected tests of attention.

The attention tests used were: (1) Cancellation of *a's* (Thorndike), (2) the Munsterberg test, which consists of underlining adjacent letter combinations which form words, in a page of mixed letters, and (3) Woodrow's attention test. The following tests, other than attention tests, were also used: Army Alpha, Otis S.A., Peterson Uniform Intelligence, Digit-Symbol, and Word Building. The

average scores on ten tests in general psychology were used. The subjects were 68 undergraduates in the general psychology class.

All of the correlations involving the attention tests were too low to be reliable, five of the entire 21 being negative. The empirical median of all the tetrad differences yielded by the table of correlations was .042. The theoretical P.E. of the tetrad differences was .041. The empirical median of the tetrad differences involving one or more correlations between attention tests was .034. These results are quite within the limits of normal expectancy, and according to Spearman's theory, indicate the absence of any group factor.

The lack of correlation between the attention tests themselves, and between the attention tests and the other tests, and also the low tetrad differences, indicate either that the attention tests do not measure attention, or that the attention involved in one function is not the same as that involved in another.

Retests of Adults at an Interval of Ten Years. S. C. GARRISON, George Peabody College for Teachers.

A number of college students were given the Yerkes-Bridges-Hardwick Point Scale during 1916–1917. Of this number 73 were retested during 1926–1930. In this group of 73 there were 32 men and 41 women. The ages ranged from eighteen to forty-nine years. From the data it appears that the more intelligent women and the less intelligent men persisted in summer work over a long period of time. Coefficients of variability were much larger at the second testing.

The Point Scale has a reliability of .81 for college students tested at an interval of two weeks. For the interval of ten years this became for the men .58 and for the women .76.

A Survey of Experimental Work on the Sensorium. LYLE H. LANIER, Vanderbilt University.

Henry Head's theory of cutaneous sensibility is reëxamined and all experimental studies of the effects of nerve section upon residual sensibility and recovery of sensibility are reviewed. Head held that "normal" sensibility usually was a complex product which resulted from integrations of nerve impulses arriving at the central nervous system over two or three sets of fibers, according or not as the "deep sensibility" fibers were involved. Clinical observations and experimental work on his own arm led him to this deduction, based upon observed sensory dissociations. Trotter and Davies, Boring, and Sharpey-Schafer repeated Head's experiment and the results of

all three studies have been held to contradict Head's hypothesis, although all of them reported essentially the same facts from which Head deduced the existence of the deep sensibility, the protopathic and the epicritic mechanisms. The writer concludes that Head's functional theory is in reality well substantiated by the clinical and experimental facts. Furthermore, Ranson has shown that the myelinated and the unmyelinated fibers which exist in cutaneous nerves probably subserve different sensory functions, the second group being the more primitive phylogenetically. This is precisely the sort of mechanism which Head's theory would require. And finally the interpretation of protopathic hypersensitivity as due to release from the epicritic mechanism is in harmony with other known facts concerning nervous function, especially the "over-reaction" of thalamic centers when cortical connections are severed.

The view that highly specialized sensory discriminations have special invariable anatomical correlates seems no longer justified. It is fruitless to look for a given pathway for a given "sensory quality." The apparently simple sensory reaction is probably a complex physiological achievement, a product of successive integrations at higher and higher levels of the nervous system, not a simple invariable result of stimulating a specialized receptor followed by conduction to a specific cortical locus. The work of Sherrington and others has made this kind of concept familiar and natural as far as motor activities go, but on the sensory side the "constancy hypothesis" has dominated us. Head's splendid work on the nature of sensory functions in general is commended to psychologists who often tend to over-simplify the neurological foundations of behavior.

A Study of the General Information of College Freshmen. E. V. HOLLIS, Morehead State Normal School.

Challenging the Major Premise. A. F. LIDDELL, Florida State College for Women.

A clever debater may sometimes throw his opponent into confusion by the Falstaffian trick of denying the major premise. The function of philosophy in relation to science is rather analogous to that. Every special science is developed from a fundamental hypothesis—tentative, but while held, held fast. The pure scientist of today assumes the objective reality of the physical universe even as the medieval theologian assumed the objective reality of divine

truth. Inevitably in both fields as a body of positive truth developed dogmatism appeared. As the positive character of truth dogmatism is excellent, but it has also its negative limitation. It is exclusive, intolerant.

Genuine philosophy is never dogmatic, for philosophy is the quest for truth, not the dissemination of knowledge. When speculation results in formulated hypothesis, then a science is born of philosophy. Every such special science is infinite as it interprets the entire universe, definite as it focuses reality to a single point of view. No philosopher is privileged to say the last word; the most he can hope to accomplish is to raise the next question. There is no orthodox philosophy. Every contribution to thought must be evaluated according to its own self-evident truth, not merely as it agrees or disagrees with some previously accepted statement. The immediacy of judgment, or intuition, which recognizes the truth in a proposition is the positive quality of philosophy, that quality from which sciences take their rise. This judgment is always a synthesis of facts in experience establishing a ground for experience.

The process of thought is a restless moving through recurring phases of synthesis and criticism, each as genuine and necessary as the other. In its synthetic phases it continually brings forth positive contributions—new theories, new sciences. Grounded upon self-sufficient hypotheses and acquiring through their own development a method and technique which justifies them in and to experience, they bear witness to the power of thought to attain truth and to enjoy the attainment. But negative criticism is equally the manifestation of philosophy. And the conflict between construction and destruction is without end. "The upward and the downward movement are the same."

Philosophy is pure thought moving freely in its own process. This process "supplies its own raw material and also consumes its finished products." (H. H. Williams, *Modern Logic*, Introduction, p. XVI.)

Philosophy can never be reduced to science, for science, organizing data in intelligible terms, is the definite statement of positive truth, but philosophy is the infinite struggle toward absolute truth. As infinite it must express itself through the definite, yet repudiate the limitation of its own expression. For, "the knowing process is a critical process. This quality lies in the structure of knowing. The only protection against criticism is ignorance." (Ibid., p. 174.)

Experiments and Problems in Social Psychology. A. S. EDWARDS, University of Georgia.

A laboratory course in Social Psychology is outlined. Attempt has been made to get as much as possible of the experimental method and attitude into the course. Not all of the work can be called definitely experimental and therefore the term "problems" has been used along with that of experiments; but all the work can be taken into the laboratory and laboratory methods applied to the gathering of data and dealing with it after it has been obtained. Instructions for 55 experiments and problems are outlined; in addition, 42 experiments and problems are suggested for further work. It is believed that from these 97 experiments and problems it is possible to select at least 30 that might make the basis for a laboratory course in Social Psychology.

Instances of Non-Learned Behavior in Birds and Mammals. H. C. SANBORN, Vanderbilt University.

The main part of the paper is concerned with the inheritance of song in birds to which are appended certain other isolated instances of non-learned behavior in birds and mammals. The early experiments of Barrington in the eighteenth century seem to demonstrate that the songs of birds are not inherited but, on the contrary, acquired through imitation of the songs of older birds and of other sounds in the environment. These results received support through the later work of Witchell, Scott, and Conradi. Nevertheless, experiments carried on by the author from the summer of 1922 up to the present time show that the songs of Baltimore orioles, Kentucky cardinals, bluebirds, robins, brown thrashers, indigo buntings, goldfinches, and English sparrows, as well as the typical hooting of a screech owl, were in fact inherited. On the basis of the previous results and those given in this preliminary report, the author suggests the tentative hypothesis that there are mimics in all species of birds. In most species, however, these are probably not so gifted as is the case with the specific mimics such as the Indian shama thrush, the mocking-bird, and the European bullfinch. The earlier experiments had perhaps to do with such mimics in the species observed. In most species a characteristic song is probably inherited, though often considerably modified through individual differences due to imitation. In some species of all birds this mimicking tendency may be so strong as to cause them to give up the original song quite early, as is perhaps

regularly the case with the trained European bullfinch. The work is to be continued until satisfactory phonographic records of the songs have been produced.

A Study of Fears in Women. MARIE H. MEANS, Alabama State College.

Effects of Unreliability on Group Comparisons in Learning. JOSEPH PETERSON, George Peabody College for Teachers.

The formula for the P. E. of means and of differences of means (or of medians) were developed on the assumption that these P. E.'s are based on true measures. If any one will give to a large number of subjects several forms of any given "test" or learning exercise, he will find that an average of all the scores of the several subjects will give a reliability measure of the entire group which is appreciably less than that derived from any single measure (except for learning processes having large practice effect, for which a correction should then be made). It is obvious that the reduction in the size of the variability measure thus effected will vary with the reliability of the measure used and the homogeneity of the individuals measured. If the measure has zero reliability all cases will tend to concentrate at the mean (approach O variability) whereas there will be no reduction if the test has perfect reliability and practice effect is unappreciable. Kelley has shown that the true standard deviation of a measure is approximately indicated by multiplying the obtained standard deviation by the square root of the reliability of the test ($o\text{—}_t = o\text{—}\sqrt{r}$), and Tryon has shown that this correction considerably affects the P. E. of a difference of central tendencies (*e.g.* $\text{P. E.}_d = \sqrt{o\text{—}^2_{m_1} r + o\text{—}^2_{m_2} r} = \sqrt{r}\sqrt{o\text{—}^2_{m_1} + o\text{—}^2_{m_2}}$, if the same test is applied to comparable groups as to heterogeneity). This correction also applies to the long formula of which the short one is only a special case. It should be noted that when a difference is stated in terms of the o— of one of the groups compared (d/o_1) gives a too small difference if the measure is not perfectly reliable and it must be similarly corrected ($d/o\text{—}_1\sqrt{r}$). When reliabilities are very low these corrections, of course, are poor substitutes for more reliable measures.

The Rational Learning problem has been used in race comparisons of considerable numbers of white and negro children of ages eight, nine, ten, and twelve years. Making allowance for unreliabilities (now that they are available from two separate applications),

reduces certain inconsistencies, makes a few differences formerly reported as now reliable, now statistically reliable, and shows a consistent decrease in size of differences with increase in age (eight, nine, ten, and twelve years). Some of the difference between twelve-year-old race groups are small and unreliable. These results are contradictory to those by Arlitt (*J. Applied Psychol.*, 1922, 6, 378–389) and to the view often met, that negroes are at first not retarded mentally and fall more and more behind the whites with advance of years. (All children in our groups were selected by ages irrespective of grade classifications in school.) Are these results due to a more rapidly increasing growth of abilities in the negroes with increase of age up to twelve years, or to a more rigid elimination of the dullards among the negroes, who generally show a much larger per cent of elimination than do the whites? We do not know, because there are yet too many indeterminate factors involved.

Academic Background as a Basis for Predicting Students' Success in College. JOSEPH V. YARBOROUGH, Southern Methodist University.

The purpose of this study is to present statistical data which will show the relationship between the academic achievements of the student's family in the generation immediately preceding him and his own success in college. Specifically, the study attempts to answer the question, "Does the student from a family where all the members are college graduates have a better chance for success in the college classroom than the student from a family of which no member ever attended college?" Success is measured in terms of scores on the battery of tests in the Psychological Examination prepared by the American Council on Education, and by actual grades earned in the college courses. The students' father, mother, uncles and aunts are considered in the study.

After a careful examination of the academic background of 2,102 freshmen who have passed through the Personnel Department of Southern Methodist University during the past five years, we are able to draw the following conclusions:

1. Only 4.2 per cent of the student body have an "all-college background": *i.e.*, father, mother, uncles and aunts who are college graduates.

2. Over the five-year period only 8.3 per cent of the students have come from families of no academic background. In their own circle they are pioneers in college work.

3. The group with all-college background made 22.6 per cent better scores on the Psychological Examination than the group with no college experience in its background.

4. A member of the non-college group stands a three-to-one chance of falling into the lowest 10 per cent instead of the highest 10 per cent of his class.

5. A member of the all-college group has slightly less than a three-to-one chance of winning a place in the highest instead of the lowest 10 per cent of the class.

6. The average grade earned in the college courses by the non-college group is *D*, while that of the all-college group is *B*.

A Study of the Individual Variation of College Freshmen on Certain Entrance Tests and Scholastic Grades. PAUL L. BOYNTON and KEH-CHING CHEN, University of Kentucky.

The problem in this study is to determine the extent to which one may expect the average college freshman to vary in his scores on a series of standardized placement tests and scholarship records. One hundred and twenty students were included in the study. They were the first 120 in the alphabet whose records were complete throughout. Thirteen different records were available on each student. Seven of these were test records, one psychology test, three English tests, and three mathematics tests. Six grades were used, both semesters of English, both semesters of mathematics, and total standings for both semesters. Records for the freshman class of 1928–29.

All raw scores were transmuted into sigma-scores and the ranges of individual variability were computed from these comparable scores. The average freshman was found to vary in the 13 measures by as much as 56 per cent of the average group range on the 13 measures, and by as much as 147 per cent of the difference between the average superior and average inferior individual in the various measures. Seventy-eight inter-alienation coefficients were computed. The lowest of these was .5268 and the highest .9992. The median was .9156. It was thought that findings should have an important bearing on problems of educational, vocational and psychological guidance.

Our Twenty-fifth Anniversary. J. B. MINER, University of Kentucky.

Asked to prepare a paper in celebration of its anniversary, the writer presented an account of the preliminary organization of the Society February 23, 1904, and its first program on December 27 of that year. The letters of congratulation from officers of the national

organizations at that time, minutes and letters from the late Prof. Edward F. Buchner, which had been preserved, indicated that its founding could be clearly traced to him. He acted as secretary for its first six years and then as president. After describing the conditions in the early years, eight tables were presented comparing those years with the present academic and professional status of the subjects, laboratories, research, courses offered and training of the teachers. The writer concluded that psychology in the South today was quantitatively on a par with that in the whole country twenty-five years ago. He then congratulated the Society on two unique achievements: its continued affiliation between the two subjects, and its introduction of a plan for raising the standard of teachers through the recommendation of non-transfer of credits for courses offered by those improperly trained through the publication of a list of approved courses and institutions in the South. He raised the question whether the Society was not in a specially favorable position for coördinating work in the colleges bearing on the human factor. At present this work is in danger of being disastrously shattered into bits by the other important tendency of specialization.

Can Religion Blend with Modern Science? H. M. JOHNSON, Mellon Institute.

Those who seek a means of blending science and religion into a single unified system of discourse appear to have overlooked certain logical considerations that are actually fundamental.

Any treatment of the facts of experience owes its form to a choice of axioms, which serve as rules of description, and also as rules of procedure. If we should choose a complete set of axioms that are independent of each other, we could give (if we were wise enough) a complete description of experience in a form that would satisfy all of these axioms. A variety of sets is possible; if we should choose one set, and adhere to it, we should get a scientific treatment; if we choose another set we should get a religious treatment; if we should take still another set, we should get a romantic treatment, and so on. But if any axiom in one set should contradict any axiom in another set, the two forms of description would not agree, nor could they be harmonized.

Although the validity of all propositions and doctrines is to be tested by the axioms of the system to which they belong, there is no test of the truth of the axioms themselves. Axioms in fact are neither true nor false; they are mere arbitrary assumptions, chosen for convenience alone.

Two axioms, at least, of modern science, are contradicted by conventional religion. To deny them in science would destroy scientific endeavor as we now know it; to admit them in religion would be equally fatal.

The first of these axioms is the doctrine of physical determinism: *i.e.*, that the future of any physical system is completely determined by its present configuration and by its immediate past history. This doctrine is unproved and unprovable; but any scientist who considers the possibility of its being false is a scientist who is about to retire. Why? Because he would then have an excuse to abandon his search for natural law whenever he might become baffled; he must not admit the possibility of caprice as long as he is engaged in his search. But the doctrine of physical determinism contradicts the doctrine of an intervening providence and a free human will—a doctrine which could not be eliminated from conventional religion without destroying it.

A second axiom of science is its criterion of the validity of knowledge. It rejects as invalid all propositions that are not based on common observation, or inferred from the facts of observation by the rules of conventional logic. Religion, however, affirms that a third kind of knowledge is also valid: knowledge that does not depend on observation or reasoning, but which is superior to knowledge that does. It is on this third, or mystical, kind of knowledge that religion bases its claim to authority. The claim to mystic knowledge may be based on a claim to intuition or personal insight; to a private revelation; to the infallibility of a prophet or leader, a collection of writings, or a priesthood. A religion that asserted no claim to mystic knowledge would probably make no headway; a science that admitted such a criterion of truth would thereby commit suicide.

If this statement of the case is correct, science and religion cannot blend. Indeed, the more progress is made toward perfection of the two systems, the more evident the contradictions will become.

The proper conclusion is not that a person cannot be scientific, and also religious: but that he cannot be both at the same time. There is no reason why he should not turn from one system to the other as often as he may find it convenient to do so; but as long as he is engaged in either of these activities he must repress some tendencies to carry on the other.

Results and Implications of Certain Experiments in Learning. JAMES L. GRAHAM, George Peabody College for Teachers.

The Function of Philosophy in the Life of Man. CHARLES S. DWIGHT, Keuka College.

In its simplest terms "philosophy" means a theory that results in a practice, a certain set of one's powers, art of conduct, or attitude of purposive expectancy—as when we speak of The Teacher's Philosophy of Life. When it becomes highly technical it merges into "metaphysics." Both words have a high and aristocratic lineage. Philosophy generalizes, unifies, interprets meaning, traces out causality, inspires to action. Properly it seeks to do justice both to the cognitive and the empirical factors in life—in a word it deals with conscious experience. The non-additive view of the nature and province of philosophy is here taken, namely, that it is not the mere sum of concrete particulars supplied by the special sciences, or a simple generalization from their postulates but performs a unique function of its own, somewhat as the atmosphere which is not composed of animals supplies breath to all living creatures. Philosophy is a point of view, an interpretation, immanent in the sciences yet transcending them, a synthesis that is more than a synopsis contributing voice, vision, and virtue to human life.

Compensatory Head Movements in Fowls. KNIGHT DUNLAP, Johns Hopkins University.

The compensatory movements of the head in chickens and starlings are shown by motion pictures to be quite different in nature from those of the duck, and to be due to visual stimulation. The relation of nictitation to head movement is shown. The apparent back-and-forth movement of the head of the chicken, pigeon, and starling is demonstrated to be an illusion, the head really moving forward only, periodically stopping each time for the body to catch up.

Individual Differences in Several Fundamental Capacities and Their Significance. P. F. FINNER, Florida State College for Women.

Measurements of an individual in certain capacities yields to results, the average of the performance and its variability. The paper reported (1) the extent of individual differences in both average and standard deviation for a number of capacities, and (2) the significance of these differences (partly in terms of coefficient of correlation) for larger activities. Several of the conclusions on the significance of the measurements follow: (1) Speed in tapping and reaction time shows a small positive correlation with intellectual level; (2) the reaction time decreases with age between six and fifteen, the age limits between which this part of the study was con-

ducted; (3) a short reaction time is definitely connected with rapid work in typewriting and with proficiency in certain forms of athletics; (4) the variability of the performance is related positively and significantly high with intellectual level; (5) steadiness and weight limen are independent of academic success, but both bear a significant relation to success in dancing and to certain forms of athletics; (6) all anthropological measurements tend to show a small positive but insignificant relationship with intellectual level. In general, it appears that every grade of ability in every capacity is significant for effectiveness in some field, but it is difficult to establish this relationship.

A Mechanical Tester in Multiple Choice Learning. H. J. PETERSON, State Teachers College.

Conforming to the general idea, supported by an increasing amount of experimental evidence, that learning is facilitated by an immediate and continuous knowledge of the degree of success, the test here being demonstrated was devised so as to embody the following important characteristics:

1. That, employed either as an assignment or as a test device, it is *self-informing* as to the correctness or incorrectness of the student's responses.

2. That the answers be so registered that every response, whether correct or incorrect, leaves a permanent record.

3. That it be *fraud-proof*, precluding any possibility of effacing the mark of an erroneous response, or of registering the correct response except through knowledge or chance, correction for the latter of which can be made.

4. That, with various modifications and adaptations, it may be fitted for important research investigations.

5. That it be simple and inexpensive and therefore practicable for general class use.

Two general forms of such device (actually demonstrated at the meeting) have been produced:

First, the mechanical form which in brief consists of a sealed envelope containing an impenetrable sheet (protected against exposure of correct responses by touch and vision) so perforated that when a pointed instrument is pressed into the opening in the containing envelope indicating the correct response, it passes through the entire mechanism with but little resistance. If the wrong response is made, however, the passage of the instrument is blocked, indicating the correctness of the attempt but nevertheless registering it on a record sheet within the envelope.

Second, the chemical form, in which the various possible responses are indicated in multiple choice form on a sheet sealed in a transparent-faced envelope. For each question (printed on separate sheets) the point corresponding to the correct response has been chemically treated such that if a needle, containing a second solution, penetrates it, a deep color appears. If a wrong response is made no color is produced although a perforation has been made and remains to indicate such response.

The Influence of Similarity of Meaning Upon Degree of Retroactive Inhibition. J. A. McGeoch, University of Arkansas.

The problem of the influence upon retroactive inhibition of the similarity obtaining between original and interpolated materials is faced with the difficulty of quantifying similarity. In most of the actual situations in which retroactive inhibition operates, if similarity is an important factor, it must be similarity of the meanings of the original and interpolated materials. In these experiments an attempt has been made to quantify similarity in terms of the ratings of large numbers of judges. In Experiment I the learning material consisted of lists of ten adjectives. The interpolated adjectives, nonsense syllables and three-place numbers, each rated with reference to the similarity of meaning between it and the orginal list. In Experiment II lists of synonyms, divided by judges into three classes with respect to their closeness of relation to the corresponding adjectives in the original list, served as interpolated materials. The rest condition in both experiments corresponded to the above work conditions save that the interval was filled by reading jokes.

In Experiment I, 32 subjects went through the conditions in counterbalanced order. A constant learning frequency of five trials was employed with the original lists and one of ten trials with the interpolated lists. After a ten-minute interval the original lists were relearned to a criterion of three successive perfect trials. In Experiment II, 24 subjects went through the four conditions with the same procedure as in Experiment I. All lists were learned by the anticipation method and were exposed at a two-second rate on an electrically driven memory drum.

In Experiment I retroaction varies directly as degree of rated similarity and in Experiment II, in which all interpolated lists are synonyms of the corresponding adjectives in the original lists, retroaction likewise varies directly with similarity. Identity of meaning thus yields greatest inhibition. In both experiments, while recall and relearning show different amounts of retroaction, the tendencies are the same. The theoretical implications will be discussed.

SURVEY OF CONDITIONS AND FACILITIES FOR THE TEACHING OF PSYCHOLOGY IN THE STATE OF OHIO[1]

BY MARTIN L. REYMERT
(*Formerly of Wittenberg College*[2])

AND

H. J. ARNOLD
(*Wittenberg College*)

INTRODUCTION

When in April, 1929, psychology for the first time was made an independent section in the Ohio College Association (having up to that time been associated with the department of philosophy) a constitution was framed and adopted which might deserve general attention as probably the first attempt inside a State College Association to work out and formulate definite standards for the teaching of psychology in institutions of higher learning. As it also through its Article III, Section 2, will afford an understanding of the background for the undertaking of the present survey, it is reproduced below:

CONSTITUTION

PSYCHOLOGY SECTION OF OHIO COLLEGE ASSOCIATION

Article I

This society shall be known as the "Psychology Section, Ohio College Association."

Article II

The object of this Section shall be an interchange of ideas and the adoption of rules designed to promote the teaching of, and research in, psychology in the colleges and universities of Ohio.

Article III

Section 1. The members of any (a) Department of Psychology, or (b) Department of Philosophy and Psychology in an institution which holds

[1] This paper was read in part to the Psychology section of the annual meeting of the Ohio College Association in April, 1930.

[2] Since September, 1930, Director of the Mooseheart Laboratory for Child Research.

membership in the Ohio College Association must be admitted to membership if the following conditions are satisfied:

(1) The Department must have at least one professor with a Ph.D. in psychology engaged exclusively in teaching psychology, or such other person engaged in teaching psychology in a college of the Ohio College Association who in the unanimous judgment of the executive committee meets high professional standards.

(2) The library and laboratory facilities must meet the requirements as they may be adopted, and from time to time revised, by regular annual meetings.

(3) The teaching shall be scientific in spirit and method; that is, it shall endeavor to acquaint the student wherever possible with alternative explanations and to inculcate reliance for the highest probability of truth upon critical investigation and interpretation of experience.

(4) At least one scholarly publication shall issue from each Department each year, or other satisfactory evidence be furnished of creative scholarship within the year.

Section 2. All applications for membership shall be referred to the Executive Committee at least three months before the annual meeting at which admission will be sought.

Section 3. *An annual report must be furnished by each Department* with sufficient evidence that the conditions of Section 1, this Article, remain satisfied. Any Department failing for three successive years without sufficient reason to furnish this report, or to satisfy these conditions, or to pay the annual fee, or to be represented at the annual meeting, shall lose its membership in the Section.

Article IV

The annual fee shall be one dollar for every member of the Department with instructor rank or higher. Additional revenue shall be provided by action of the Section.

Article V

Section 1. The officers shall be President, Secretary-Treasurer, and Adviser, to be elected one each year for a term of three years whose duties shall be those usually belonging to their several offices, except that the Adviser shall investigate the annual reports, the applications for membership, and, with the approval of the Executive Committee in each instance, the status of member Departments in general, and make an annual report to the Section. These three officers shall constitute the Executive Committee which shall prepare the regular programs, make recommendations for membership and other actions, and attend to all business that may arise during the year.[1]

Section 2. The Secretary-Treasurer shall pay out the funds of the Section only upon order signed by the President.

Article VI

The Section shall hold at least one session each year at the time and place of the meeting of the Ohio College Association, and invitations to attend and participate, except in voting, in all meetings shall be sent to all teachers of Psychology in Ohio irrespective of membership.

[1] The first officers were: Adviser, F. C. Dockeray; President, M. L. Reymert; Secretary-Treasurer, H. B. English.

Article VII

These articles may be amended at any session after a notice given at a previous regular meeting, by a vote of two-thirds of the members present.

In order to secure full coöperation from all departments of psychology in Ohio and to be able to make as complete a survey as possible, a letter was first sent to the President of each college and university explaining the purpose and value of the survey, soliciting the coöperation of his institution, and requesting him to designate the member of his staff who should represent his institution and be responsible for the distribution and return of the blanks.[1] A form letter on which were requested the two items, (1) name of the designated representative, and (2) number of psychology instructors, was asked to be returned.

Out of 50 colleges and universities originally appealed to, 47 agreed to participate in the survey by returning the form letter signed by the President or Dean.[2] Of these 47 institutions a total of 39, or 83 per cent, responded by returning copies of Blank I[3] filled out by the psychology instructors, and 36, or 77 per cent, returned Blank II. For the sake of convenience each of these blanks is treated as a separate part in this paper.

PART I

Qualifications of Instructors[4]

From the 39 institutions, 144 instructors filled out and returned Blank I. Of this number 113, or 78 per cent, were men and 31, or

[1] The senior writer called upon Prof. H. J. Arnold, as his associate in making the survey. Prof. Albert P. Weiss of Ohio State was kind enough to give helpful suggestions in the preliminary planning. A previous similar survey by Peterson proved of great help. Unfortunately lack of space has forbidden a full account of the various steps by which the data were obtained. For similar reasons several detailed tables and two graphs (the latter showing replacement values of laboratory equipment and annual appropriations for laboratory equipment, books, and journals for the individual colleges) also had to be omitted. Such data will gladly be furnished upon request.

[2] The following institutions expressed their regrets because of their inability to participate: University of Dayton; Rio Grande College; John Carroll University; Notre Dame College; Teachers College, Athenæum of Ohio.

[3] The following institutions, after repeated requests, failed to return reports and, therefore, could not be included: Bowling Green State College; College of the Sacred Heart in Cincinnati; Hiram College; and Normal Douglas School, Columbus.

[4] In connection with this survey one of the writers (Reymert) has tried to develop an objective rating scale for psychologists with the idea in mind of having three disinterested judges rate each psychologist in Ohio on the

22 per cent, women. The 144 who reported represent approximately 98 per cent of the teachers of psychology and educational psychology in the 39 institutions participating.

Ages of Ohio College Teachers of Psychology

One hundred and ten men (97 per cent) and 25 women (80 per cent) reported their ages, while 3 men and 6 women neglected to fill in this item.

The frequency distributions for men, women, and total are presented in Table I.

TABLE I

DISTRIBUTION OF AGES OF OHIO COLLEGE TEACHERS OF PSYCHOLOGY

Age in Years	Men	Women	Total	Per cent
65–76	1	1	2	1
50–64	25	3	28	21
35–49	41	12	53	39
20–34	43	9	52	39
Total	110	25	135	
No report	3	6	9	
Median	39	38	38.6	
Range	22–76	22–73	22–76	

The median age of the men is thirty-nine years and the range from twenty-two to seventy-six. It is interesting to note that 26 of the men teachers of psychology in Ohio, or 24 per cent, are past fifty years of age.

For the distribution of women's ages the median is thirty-eight years and the range from twenty-two to seventy-three. Four, or 17 per cent, are past fifty years of age. Six women neglected to give their ages.

Position, Title, and Rank

The list of positions, titles, or ranks of 113 men and 31 women and their frequencies are presented in Table II.

Number of Teaching Hours per Week (Part Time)

Since fewer than 50 per cent answered this item, the data probably do not represent the actual situation. However, the median number of hours taught by the 49 men who reported is 10 hours. In the case of 13 women, the median number of hours taught per week is 6.

basis of the data furnished by himself on Blank I of the questionnaire. This rating scale is still in process of completion and this whole matter may be reported upon later.

TABLE II

Position, Title, or Rank	Men	Women	Total	Per cent
Head of department of psychology	24	11	25	17
Professor of psychology	20	5	25	17
Associate professor of psychology	15	2	17	12
Assistant professor of psychology	20	4	24	17
Instructor in psychology	16	7	23	16
Lecturer in psychology	1	1	2	1
Professor of education	7	1	8	6
Associate professor of education	2	3	5	3
Assistant professor of education	1	1	2	1
Professor of philosophy	2	0	2	1
Dean	1	0	1	1
Miscellaneous	2	2	4	3
No report	2	4	6	4
Total	113	31	144	

A possible explanation for the apparent hesitancy to record the actual number of hours of psychology being taught is perhaps that in some of the smaller colleges a considerable number of psychology instructors are required to devote much of their time to teaching in other departments.

Years of Experience in the Teaching of Psychology

A total of 110 men (97 per cent) and 27 women (83 per cent) gave the information called for in this item, while 3 men and 4 women did not answer. The median number of years taught by the men is 4.5, the range being from 1 to 42. One professor has been teaching psychology for 42 years, another for 36 years. Ten per cent have taught 25 years or more.

The median period of service for the women is 5.5 years, with a range of from 1 to 20. Two women have each taught psychology for 20 years, 1 for 12 years, and 1 for 11 years. It will be noted that the median period of service of the women (5.5) exceeds that of the men (4.5) by just one year.

Field of Previous Service

In answer to the question, "In what field did you work before accepting your present position?" a total of 33 different fields were mentioned.

The various fields together with the frequency of mention are presented in Table III.

These facts indicate that the large majority of teachers of psychology either have entered psychology directly or have come from closely related fields. Those who have come from education are

TABLE III

	Men	Women	Total	Per cent
Psychology	19	4	23	16
Psychology and education	10	5	15	10
Psychology and biology	3	0	3	2
Psychology and philosophy	11	0	11	8
Education	3	4	7	5
Industrial education	2		2	1
Graduate student	5	2	7	5
Superintendent of schools	10	0	10	7
Principal of high school	3	1	4	3
Principal of county normal	0	2	2	1
High school teacher	14	4	18	12
Social service	1	1	2	1
Pharmacy	1		1	1
Religion	2		2	1
Speech	1		1	1
English	1		1	1
Hebrew	1		1	1
Miscellaneous	16	3	19	13
No report	10	5	15	10
Total	113	31	144	

probably largely the teachers of educational psychology, which in many of the Ohio colleges is listed in the department of education.

Fellowships, Scholarships, Teaching Fellowships, and Graduate Assistantships in Psychology

A tabulation of the replies to this question showed that Ohio Psychology teachers as a whole, in the course of their training, have received a reasonably large share of the customary university appointments such as those mentioned. A total of 144 such appointments have been held. Ohio State University with 30 such appointments, or 21 per cent, has contributed a goodly share. Columbia comes next with 11 per cent, and Chicago third with 8 per cent. Thirty-three other institutions were mentioned.

The per cent of men and of women who have held each of the different types of appointments is as follows:

Appointment	Per cent Men	Per cent Women	Per cent Total
Fellowship	30	35	31
Scholarship	20	13	19
Assistantship	40	16	35
Instructorship	7	10	8
Research assistant	4	3	4
Laboratory assistantship	3	0	2

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The percentage of men who have been granted fellowships and scholarships is about equal to the percentage of women who have held such appointments. However, with respect to assistantships, a larger per cent of men than women have held them, the figures being 40 per cent and 16 per cent respectively.

Years Served in Present Position

There seems to be a rather large turnover of psychology teachers in Ohio. Thus, we find that the median period of service of 111 men teachers in their present positions is 3.1 years, the periods of service ranging from 1 to 43. Only 15 men, or 14 per cent, have served in their present positions more than 10 years. One professor has served his present institution for 43 years, while two others have each remained in the same institution for 35 years.

The median period of service in the present position for 30 women is only 1.5 years, with a range from 1 to 13 years. Only one woman has served the same institution for more than 10 years up to this time. In this connection it is well to remember that psychology has not provided positions for women for as many years as it has for men. The rapid development of clinical and educational psychology, in recent years, has brought more women into the field.

Courses in Psychology Regularly Taught

The data obtained disclose a long array of psychology courses offered in Ohio colleges and universities. Those taught more frequently are shown in Table IV.

The two most common courses are introductory psychology and educational psychology with per cents of 62 and 45 respectively; however, with respect to the women only, a larger percentage tend to teach educational psychology (63 per cent) than introductory psychology (35 per cent). These two together with tests and measurements (20 per cent) are the principal courses taught by the women.

Among the more specialized courses taught by Ohio teachers and reported with a frequency of one are the following: Pre-School Child, Points of View in Psychology, Personality and Character, Metaphysical Psychology, Mental and Social Maladjustment, Theory of Intelligence, Psychology of Religion, Psychophysics of Color, Psychology of Athletics, Business Psychology, Psychology for Nurses, Learning Process, Human Motives and Incentives, and Psychopathology.

TABLE IV

	Per cent Men	Per cent Women	Per cent Total
Introductory course	70	35	62
Educational psychology (introductory courses)	40	63	45
Social psychology	16	6	14
Abnormal psychology	14	6	13
Experimental psychology	14	6	13
Adolescence	10	6	9
Tests and measurements	10	20	12
Applied psychology	10	0	8
Child psychology	5	8	6
Clinical psychology	5	5	5
Advanced educational psychology	5	3	5
Advanced general psychology	5	0	4
Mental hygiene	5	6	6
Educational vocational guidance	5	0	4
Genetic psychology	2	6	3
Psychology of primary education	3	3	3
Psychology of secondary education	3	0	2
Maladjusted child	2	3	2
Gifted child	2	3	2
Statistics	2	3	2
Seminar	5	0	4

Academic Preparation (Earned Degrees)

The answers to this question showed that 60 per cent of the men teachers and 6 per cent of the women teachers, or a total of 51 per cent of all (144), have the Ph.D. degree. This is considerably better than what Peterson[1] found in his survey of southern institutions, namely, that in those institutions only 30 per cent of the instructors of psychology had earned the Ph.D. degree. The M.A. or M.S. is the highest degree held by 26 per cent of the men. It should be mentioned that sixteen men instructors in psychology at Ohio State University were not included in the 26 per cent inasmuch as they are not permanent instructors but graduate students who are working for the advanced degree. These men, for the most part, are instructors in the introductory courses in psychology and educational psychology. Three men in three Ohio colleges have only the bachelor's degree.

It was found that the highest degree held by 64 per cent of the women instructors of psychology and educational psychology is the

[1] Peterson, Joseph. Equipment for the Teaching of Psychology. Psychological Review, Vol. 34, No. 6, November, 1927.

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M.A. or the M.S. Four women instructors have only the bachelor's degree while one lady seventy-two years of age states that she holds no degree whatsoever.

The per cent of all instructors who have only the M.A. or M.S. degree is 42 per cent, which is somewhat less than Peterson's findings in the southern states of 51 per cent. As a general statement of comparison it may be said that the Ohio teachers of psychology tend to have higher degrees than do those in southern institutions.

Ohio State University has granted 27 of the master's degrees or 33 per cent, and 12 of the doctor's degrees or 19 per cent. Nine Ph.D.'s, or 15 per cent, have received their degrees from the University of Chicago. In this connection it may be said that probably most of the instructors who received degrees from Ohio State University are included in the groups, previously mentioned, who received appointments to fellowships, scholarships, and assistantships, at that university.

Names of Major and Minor Professors of Ohio Psychology Teachers

This item was included because it seemed reasonable to assume that the works and basic points of view of the professor with whom the psychology teacher in Ohio had his major training would be reflected in his own later teaching. Courses were taken under 247 different professors. Table V gives the list of names of the professors mentioned three or more times and the number of Ohio teachers who have worked under each.

If somewhat arbitrarily we assign these professors to five fields and determine the number of students who have majored in these fields, we obtain the following per cents: experimental psychology, 36 per cent; educational psychology, 29 per cent; clinical psychology, 14 per cent; educational, 13 per cent, and industrial psychology, 8 per cent.

Considering experimental psychology as the basic subject for psychology training, the high per centage in that field is rather encouraging. The other fields are, however, well represented.

It seems that three institutions, Ohio State with 10 professors, Columbia with 9, and Chicago with 6, must have had quite an influence on teachers in Ohio. Many professors mentioned only once are not given in the table. These include representative professors from most leading American institutions.

TABLE V

MAJOR PROFESSORS OF OHIO TEACHERS OF PSYCHOLOGY MENTIONED THREE OR MORE TIMES

Name	Frequency of mention	Name	Frequency of mention
H. H. Goddard	11	F. N. Maxfield	4
S. L. Pressey	11	L. C. Pressey	4
A. P. Weiss	11	H. E. Burtt	4
H. L. Hollingworth	8	J. F. Shepard	4
W. H. Kilpatrick	8	E. C. Sanford	3
R. S. Woodworth	7	L. E. Strayer	3
H. A. Toops	7	Wm. McDougall	3
E. L. Thorndike	7	J. McKean Cattell	3
John Dewey	5	M. C. Tufts	3
C. H. Judd	5	F. N. Freeman	3
W. B. Pillsbury	5	C. E. Seashore	3
G. S. Hall	5	C. A. Ruckmick	3
E. S. Robinson	5	W. A. McCall	3
H. Munsterberg	4	E. A. Doll	3
Harvey Carr	4	Rudolf Pintner	3
B. H. Bode	4	A. T. Poffenberger	3
G. F. Arps	4		

Courses Taken by Ohio Teachers During Their Time of Training

This question was answered by 129 of the teachers. The courses taken by them during their time of training and the number who took each are as follows:

Experimental, 91; Special Problems (A) Exper., 56; Educ. Psych., Adv., 108; Seminar in Psych., 74; General Psych., Adv., 93; Educ. Psych., Intro., 90; Gen. Psych., Intro., 126; Abnormal, 79; Child, 64; Clinical, 51; Social, 40; Adolescent, 56; Special Non. (b) Exp., 17; Genetics, 42; Physiological, 40; Behaviorism, 30; Psych. of Learning, 44; Animal, 29; History of Psych., 48; Systematic, 30; Comparative, 33; Mental Deficiency, 46; Industrial, 29; Tests and Measurements, 34; Clinical Lab., 34; Psych. of Secondary, 27; Psych. of Religion, 27; Higher Mental Processes, 23; Psych. of Primary Ed., 22; Vocational Guidance, 25; Personnel Management, 16; Statistical, 17; Psych. of Advertising, 14; Mental Disease, 19; Psych. of Maladj. Children, 18; Psych. Analysis, 13; Contemp. Psych. Liter., 3; Psychiatry, 8; Applied, 9; Research, 3; Psych. of Music, 4.

The courses are arranged in decreasing order of total amount of credit earned in them. The course in which the largest amount of credit was earned is experimental psychology with 685 hours or an average of 7.5 hours for those who have taken it; however, only 91

out of the 129 teachers, or 71 per cent, have taken this course. It is rather questionable whether instructors have a sufficient breadth of outlook to teach even introductory psychology without having taken some actual experimental work. The courses farther down the list become more or less specialized and the needs of the teachers for them depend on the particular division of psychology in which they are teaching.

Training Received in Branches Related to Psychology

Table VI shows the fields related to psychology which were listed by 144 Ohio teachers and the average number of hours of credit earned in each field. The fields are arranged in descending order of average amount of credit earned. As is apparent the natural sciences have as yet not been as much stressed in the training of the psychologists as have education, mathematics, and philosophy. The relative value and the amounts of training in these various fields, being as yet arbitrarily determined by individuals and institutions, might well

TABLE VI

CREDIT EARNED BY OHIO PSYCHOLOGY TEACHERS IN FIELDS RELATED TO PSYCHOLOGY

	Average Hours per Instructor		Average Hours per Instructor
Education	25	Physics	5
Mathematics	12	Statistics	5
Philosophy	10	Physiology	4
Biology	9	Ethics	3
French	8	Neurology	2
German	8	Logic	2
Chemistry	8	Eugenics	1
Sociology	6		

Number of teachers who answered, 144.

be given consideration in the future in an endeavor to reach a more definite agreement. It is as we all know a serious matter for the psychologist to find when he gets on the job that he must study and perfect himself in certain fields which might properly have been taken care of in his training period.

Publications by Ohio Psychology Teachers

A wide range of individual productivity on the part of the 43 teachers and professors reporting is indicated. A total of 640 publications were listed, the range extending from 1 to 84.

Table VII shows the frequency of distribution of the 640 publications reported.

TABLE VII

Number of Publications	Teachers Holding Ph.D. Degree	Teachers Holding M.A. Degree
83–84	1	
71–72	1	
57–58	2	
46–47	1	
35–36	2	
33–34		
31–32		
29–30	1	
27–28		
25–26	1	
23–24		
21–22	1	
19–20		
17–18	1	
15–16	1	
13–14		
11–12	1	
9–10	4	
7–8	1	
5–6	2	
3–4	8	4
1–2	7	4
	35	8
	M.=7.5	M.=2.5

It is interesting to note that 8 teachers holding the M.A. degree reported a total of 18 publications, or an average of 2.25 per teacher. Thirty-five teachers holding the Ph.D. degree listed 622 publications, an average of 17.6 per teacher. The medians for the two distributions respectively are 2.5 and 7.5.

It was found that 10 professors at Ohio State University contributed a total of 275 or 44 per cent of the publications listed by teachers holding the Ph.D. degree. All but one of the remaining teachers reporting one or more publications were connected with institutions having enrolments of 1,000 or more. The teachers from thirty to forty years of age seem to have the greatest productivity.

It seems clear that only teachers in the universities and the larger colleges find time to do research work. To get a clearer picture of this whole field the number of publications should be put in relation to the number of years since the Ph.D. has been received, for instance. by five year periods.

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Estimated Clock Hours of Laboratory Work in the Training of the Teachers

A total of 43 men and 18 women failed to report on this question.

More than likely a considerable number of teachers included time spent in the laboratory as graduate assistants or laboratory assistants. It was found that the median number of clock hours of the men who answered was 212 while that of the women who answered was 175.

The amount of laboratory training which is required for a higher academic degree in psychology seems from our data at present to vary greatly at the different institutions. Did the 61 who neglected to report have little or no laboratory training at all? Here as in other sections of this questionnaire study we can merely raise the issue.

Hours Per Week Spent in Teaching Experimental (Laboratory) Courses

TABLE VIII

TEACHING HOURS PER WEEK IN EXPERIMENTAL PSYCHOLOGY

Teaching Hours per Week	Frequency
12	1
8	2
7	1
6	6
5	4
4	9
3	8
2	6
0 (no teaching)	85
No report	22
Total	144
Mean	3.4

It will be noted from Table VIII that at least 85 out of the 144 do no teaching in laboratory courses. This includes 46 per cent of the men and 61 per cent of the women. The average number of weekly teaching hours in experimental psychology is 3.4.

The problem presents itself of the amount of time, if any, which should be given inside a department of psychology to laboratory courses within the various sized colleges of the state. Should psychology be introduced at all without some facilities for laboratory training? The above supplemented by various other observations from our general data seem to indicate that at present about one-half

of Ohio institutions of higher learning do not have facilities for and do not offer a course in experimental psychology.

As shown in Table IX, 55 per cent of the teachers teach during the summer, 30 per cent use their summers for academic development, and 8 per cent spend a portion of the summer vacation in doing actual research.

TABLE IX

	No. Men and Women	Per Cent	Total No. of Weeks	Av. No. of Weeks per Teacher
a. Teaching in own institution..	58	40	445	7.5
b. Teaching in other institutions	22	15	169	7.5
c. Attending university	43	30	345	8.0
d. Research	12	8	70	5.8
e. Travel	16	11	72	4.5
No report	22			

While the use of the leisure time in the summer should be left to the individual, it nevertheless might be worthwhile to consider what might be done from the side of the various institutions both in Ohio and elsewhere in order to facilitate professional advancement along any of these lines suggested in our table.

PART II

Laboratory and Library Facilities for Teaching Psychology

For this part of the survey the colleges were divided into six groups on the basis of enrolment and the answers were tabulated for each of these groups.[1] Since Group 1 included only Ohio State University, Group 1 and Group 2 were combined and treated as Group A in addition to the separate treatment of these two groups.

Replacement Value of Laboratory Apparatus and Equipment

Table X presents facts regarding replacement valuation of laboratory apparatus and equipment. The average group values of the laboratory apparatus and equipment shows a regular increase with size of enrolment. The range for all the colleges is from $60 to $33,000 and is rather large also for each of the individual groups of colleges. The averages for the groups[1] in ascending order of enrolment beginning with Group 6 are $220, $333, $1,002, $2,231 and

[1] The following grouping of colleges was made according to official enrollments in Arts and Sciences in 1928–29, as taken from the College Blue Book for 1928. The College Blue Book, Hollywood by the Sea, Fla.

$13,600. The total value of laboratory equipment and apparatus for the 36 colleges is $126,620. This amount is actually contributed to by only 20 of the colleges, or 53 per cent, as 16, mostly smaller ones, indicated no value of apparatus and equipment. For the 20 colleges having apparatus and equipment, the average is $6,331.[1]

TABLE X

VALUATION OF LABORATORY APPARATUS AND EQUIPMENT

		6	5	4	3	2	A	Total
Range	From	$1,100	$60–	$60–	$1,000–	$2,500–	$2,500–	$60–
	To	$	$3,500	$4,500	$8,000	$33,000	$33,000	$33,000
Total		$1,100	$3,660	$6,010	$17,850	$68,000	$98,000	$126,620
Average		$1,100	$1,220	$1,502	$2,742	$13,600	$16,333	$6,331
Number of colleges having App. and equipment [2]		1	3	4	6	5	6	20
Per cent		20	27	67	75	100	100	56

Ohio State Univ.—$30,000

Group 1. Enrollment, over 2,500:
Ohio State University.
Group 2. Enrollment, 1,500–2,500:
Western Reserve University
University of Cincinnati
Ohio University
Miami University
Ohio Wesleyan
University of Toledo.
Group 3. Enrollment, 1,000–1,500:
University of Akron
Kent State College
Muskingum College
Oberlin College
Ohio Northern University
Wittenberg College
College of Wooster
Group 4. Enrollment, 500–1,000:
Antioch College
Ashland College
Denison University
Mt. Union College
St. Xavier College
Wilberforce University
Group 5. Enrollment, 250–500:
Baldwin-Wallace College
Bluffton College
Capital University
Defiance College
Findlay College
Heidelberg College
Kenyon College
Marietta College
Otterbein College
Western College for Women
Wilmington College
St. Marys of the Springs
Group 6, Enrollment, 250 or less:
Cedarville College
Dayton Junior Teachers College
Lake Erie College
Ursuline College
Mt. St. Joseph College
Sisters College of Cleveland
Warren City Normal College

[1] Compare: Ruckmick, C. A.; American Journal of Psychology, 1926, Vol. 37, 582–592.

[2] This number is, of course, based on the answers available. Colleges who did not answer this question were assumed to have no apparatus and equipment. A similar assumption was made with respect to data presented in following tables.

From an inspection of the tabular results and the individual answers it was found that apparently a large number of Ohio colleges, especially those with small enrolments, have no laboratory facilities for the teaching of psychology and others are below what their enrolment would warrant.

Annual Funds Available for Laboratory Equipment, Books, and Journals in Departments of Psychology of Ohio College

Table XI shows facts regarding annual funds available for laboratory equipment, for books, and for journals. The appropriations in all Ohio colleges for apparatus range from $100 to $4,000; those for books from $18 to $500; and those for journals from $10 to $200. The range of total amounts available for the three purposes is from $15 to $4,475. Appropriations are largest for laboratory apparatus

TABLE XI

ANNUAL FUNDS FOR EQUIPMENT, BOOKS, AND JOURNALS

Enrolment Group		6	5	4	3	2	A	All colleges
ANNUAL FUNDS FOR LABORATORY EQUIPMENT								
Range	From	$100–	$100–	$100–	$250–	$300–	$300–	$100–
	To	$200	$500	$350	$500	$4,000	$4,000	$4,000
Total		$300	$1,100	$1,400	$1,050	$6,250	$8,000	$11,850
Average		$150	$367	$280	$350	$1,250	$1,333	$624
Number of colleges having funds		2	3	5	4	5	6	10
Per cent		40	27	83	50	100	100	53
Ohio State University—$1,750								
ANNUAL FUNDS FOR BOOKS								
Range	From	$20–	$18–	$50–	$50–	$50–	$50–	$18–
	To	$200	$200	$300	$350	$350	$500	$500
Total		$270	$618	$800	$1,075	$1,200	$1,700	$4,463
Average		$90	$77	$160	$154	$240	$283	$154
Number of colleges having funds		3	8	5	7	5	6	29
Per cent		60	73	83	88	100	100	81
Ohio State University—$500								
ANNUAL FUNDS FOR JOURNALS								
Range	From	$25–	$14–	$10–	$25–	$60–	$60–	$10–
	To	$60	$50	$64	$200	$150	$150	$200
Total		$85	$167	$114	$535	$469	$569	$1,470
Average		$43	$21	$29	$76	$117	$114	$57
Number of colleges having funds		2	8	4	7	4	5	26
Per cent		40	73	67	88	80	83	72
Ohio State University—$100								
Average for Books and Journals		$133	$98	$189	$230	$357	$397	$211
TOTAL ANNUAL FUNDS FOR LABORATORY EQUIPMENT, BOOKS, AND JOURNALS								
Range	From	$20–	$15–	$165–	$100–	$410–	$410–	$15–
	To	$460	$546	$600	$850	$4,475	$4,475	$4,475
Total		$655	$1,885	$2,314	$2,660	$7,919	$10,269	$17,783
Average		$164	$209	$463	$380	$1,584	$2,054	$574
Number of colleges having funds		4	9	5	7	5	6	31
Per cent		80	82	83	88	100	100	86
Ohio State University—$2,350								

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and equipment, second largest for books and least for journals. This relationship holds for every group and for the entire number of colleges. For the entire number the average for apparatus is $624, for books $154, for journals $57, and for total of all three purposes $574.

There is a more or less definite tendency for appropriations for each of the three purposes and for the total to increase with size of college enrolment. This tendency is more pronounced where total amounts of appropriations for the three purposes are considered. The average departmental appropriations in the case of the total for Groups 6, 5, 4, 3, and 2, respectively, are $164, $209, $386, $380, and $1,584.

The total amount of funds available annually for the three purposes (laboratory equipment, books, and journals), including Ohio State University, is $17,783. The 6 colleges in Group A make up $10,269, or 58 per cent, of this amount. The average for the 31 colleges, or the 86 per cent who gave definite amounts, is $574. Considering that some colleges did not specify the amounts of available funds, it may be estimated that the total available amount for the three purposes in round numbers is $20,000.

Inspection of the individual answers regarding the amounts of funds available to departments of psychology in the individual colleges for the three above-mentioned purposes showed that more of the colleges have funds available for books and journals than for laboratory equipment. Sixteen of the 36 colleges have no appropriations for laboratory equipment, two none for books, and five none for journals (if it be taken for granted that those who did not answer have no funds). Of the sixteen having no appropriations for laboratory equipment 11 are in Groups of 5 and 6. Only one college, St. Xavier, gave indication of no appropriation for any of the three purposes.

From an inspection and comparison of the individual answers it was found that there is some positive relation between the replacement value of equipment and apparatus and the annual amount appropriated for laboratory equipment, books, and journals. However, there were some evident exceptions: for instance, of the colleges in Group 4, Wilberforce with no valuation for laboratory apparatus and equipment has an annual appropriation of $300 for laboratory equipment and $300 for books. In general, it may be added that, as one would expect, in the smaller schools there is a tendency for appropriations to be made for books and journals rather than for laboratory

equipment; whereas, in the larger colleges appropriations for laboratory equipment exceed those for books or journals.

Sources of Available Funds

The various answers to the question regarding sources of funds showed no apparent relation between size of enrolment and source of funds. The source of available funds mentioned the largest number of times, 18, was the general college funds. Fees and tuition of students was mentioned 10 times; library fund 5 times; and state appropriation 4 times. These sources constituted almost 80 per cent of all the sources mentioned. However, these facts do not give a valid indication as to the amounts coming from these sources because the categories given in the replies were probably not mutually exclusive and are not unambiguous.

Other sources mentioned were city tax, book room receipts, endowment, special gifts, special funds from graduate school, and diocesan appropriation.

Pieces of Apparatus Listed as Important

Because of the fact that responses were so varied with respect to the important pieces of apparatus mentioned and since over one-third of the colleges did not commit themselves specifically, no meaningful comparisons could be drawn. The pieces of apparatus listed varied all the way from chronoscopes, plthysmographs, psychogalvanic apparatus, apparatus for quantitative smell work, aesthesiometers, and a polyergometer to pieces of standard practical test materials. Color apparatus; models of brain, eye, and ear; mirror drawing outfits; and various chronoscopes were mentioned frequently. Had this question been answered more fully and carefully, it might have given some suggestion about the kind of laboratory psychology which is at the present time regarded as important in the minds of psychology instructors. The returns leave the general impression of extreme individualism in the choice of apparatus and content of laboratory courses.

Use Made of Facilities in Other Departments

Seventeen of the 36 colleges, or 47 per cent, replied to the effect that they made use of facilities offered by other departments.

The department most frequently mentioned is physics, from which are borrowed electrical devices, apparatus for light and sound, etc. In some colleges models and charts are borrowed from the departments of biology and physiology. The department of education

comes in for exchange of calculators and test materials. In the smaller colleges where funds are low interdepartmental purchases might be of help.

Departments of psychology in the larger colleges tend to draw on other departments more than do the departments in the smaller institutions. However, the department of psychology at Ohio State University does not borrow from other departments, because it is no doubt well supplied with its own instruments. Thirty of all the colleges, or 83 per cent, either have apparatus of their own or are using apparatus of other departments. All of the larger colleges with enrolments of 1,000 or over are included in this group.

Amount of Floor Space Available Exclusively for Laboratory Use

The range of amounts of floor space available exclusively for laboratory use as shown in Table XII is from 136 square feet to 13,290 square feet. If the minimum amount represents one room, then Ohio State University has space equivalent to 94 such rooms. The total of the amounts given is 41,341 square feet. The average for those having available space is 1,969 square feet.

Judging from the number of colleges who gave amounts of space available exclusively for laboratory use, it appears that 21 of the colleges, or 58 per cent, have psychological laboratories, whatever the size may be.

The preliminary standard averages given in the table may well serve as a check for the institutions within the various groups of enrolment.

Approximate Number of Books on Psychology and Educational Psychology in the Libraries[1]

The range of number of psychological books available in the libraries is from 40 to 4,410. The total number is 24,324 and the average 676. There is an apparent tendency evident from Table XIII for numbers of books to increase with size of college. It is interesting to note, however, that Lake Erie College in Group 6 with 750 psychological books has as many as the median of Group 2. One school in group 2, which happens to be Miami, has only about as many as the median of group 4. It may also be of interest to note that the University of Cincinnati and Ohio State University each

[1] It is interesting to note here that Dr. F. C. Dockeray, as one of the three officers of the psychology section of the O.C.A. in the rôle of "Adviser" has empirically compiled a minimum list of books and periodicals for Ohio colleges. There has already been great demand for this list.

TABLE XII

LABORATORY FLOOR SPACE
(values given in square feet)

	Group	6	5	4	3	2	A	All colleges
Range	From	900	136–	600–	600–	160–	160–	136–
	To		1,300	1,373	4,500	2,750	13,290	13,290
Total		900	3,056	3,221	10,500	10,374	23,664	41,341
Average		900	611	1,074	1,750	2,075	3,944	1,969
Number of colleges having floor space		1	5	3	6	5	6	21
Per cent		20	45	38	75	100	100	58

Ohio State University—13,290

have 4,000 or over which is at least a thousand more than any of the others.

TABLE XIII

DISTRIBUTIONS OF NUMBERS OF BOOKS BY GROUPS OF COLLEGES

Number of Books	Enrolment Group	6	5	4	3	2	A	All colleges
4,000–4,999						1	2	2
3,000–3,999								
2,000–2,999					1			1
1,000–1,999				2	2	1	1	5
700–999		1			1	2	2	4
500–699			1		2			3
400–499			1					1
300–399			1	2		1	1	4
200–299			2		1			3
100–199		2	3	2	1			8
0–99		2	3					5
Range in number		40–750	50–500	125–1,246	125–2,000	350–4,000	350–4,410	40–4,410
Total		1,118	2,200	3,221	6,425	6,950	11,360	24,324—
Average		224	200	537	803	1,390	1,893	676

Ohio State University—4,410

Psychological Journals Which Are Available in the Library or Laboratory

Table XIV gives the distributions of the number of psychological journals to be had in the libraries of the various colleges; there is a similar positive relation of number of journals to size of college as there is for books. The median number for all the colleges is 4.4. One factor contributing to this low figure is that four of the smaller schools take no journals at all. The largest number of journals taken by any college with the exception of Ohio State University is 19. Ohio State has practically all of the English ones and some foreign ones.

Use Made of Test Materials

Fifteen colleges reported a use of tests for entering freshmen, thirteen in test and measurements courses, ten in connection with teaching, four in educational and vocational guidance and personnel work, five for research uses, and five for clinical testing. Six gave

TABLE XIV

DISTRIBUTIONS OF NUMBER OF JOURNALS BY GROUPS OF COLLEGES

Enrollment Groups	6	5	4	3	2	A	All Colleges
20 and more						1	1
15–19				2	2	2	4
10–14		1	1		3	3	5
5–9	1		2	3			6
3–4	1	4		2			7
2		2	3	1			6
1	1	2					3
0	2	2					4
Median							4.4

no answer to the question. It seems to be apparent from these facts that in several institutions much of the test work is being handled by the department of psychology.

The Departmental Place of Educational Psychology

Twelve colleges, or 33 per cent, indicated that educational psychology was taught in the department of psychology; in 19, or 53 per cent, of the colleges it is taught in the department of education. In 3 colleges the departments of psychology and education are combined into one department. Two colleges have the course taught in both departments. In the smaller colleges the course is offered in the department of education more often than in the larger.

Psychology Club or Fraternity

Five institutions mentioned that they have a psychology club or fraternity. These are Muskingum, Wittenberg, Ohio University, Ohio Wesleyan, and Ohio State University. Kent State College and Denison University plan to have one soon.

Plans and Needs for Extended Facilities as Voiced by the Heads of Departments

Seventeen colleges indicated that they have plans for increasing their laboratory equipment. This number includes both large and small colleges. Some are just starting laboratories, some are adding new psychological divisions, such as clinical psychology, which require new apparatus, and some are simply adding general equipment each year. The following statement was given by a college in Group 4:

"Pieces adaptable for (a) Demonstration, (b) Research.

"I do not greatly value the laboratory practicum alias 'bottle washing'—hence do not duplicate much."

Ten colleges mentioned special needs, some of which are already being planned for. Some of such needs were: "separate laboratory

space," "standard equipment in general and clinical psychology," "sound-proof rooms," "larger work shop with mechanician," and "apparatus for learning experiments." One large college in Group A mentioned the following needs: "spirometer, electro-cardiograph, string-galvanometer, basal-metabolism apparatus, surgical equipment for comparative laboratory, and general hospital." Another large college in the same group mentioned: "set of condensers for analyzing tones, galvanometers for tonal analysis, apparatus for producing homogeneous lights, and hospital with infants in it."

Plans for Developing a Laboratory

Ten colleges, mostly smaller ones, have plans for developing a laboratory. The statement of plans of one small college in Group 4 was: "We expect our $3,300,000 Centennial Campaign to go over and that will mean that psychology will have one floor in a new biology building." A large college in Group A answered: "We shall soon move into the old Library Building which is to be made fireproof and extensively remodeled for the use of our department."

Provisions Made by Administration for Paying Traveling Expenses of Instructors Who Desire to Attend Psychological Conferences

Fifteen colleges stated definitely that there was no provision for traveling expenses of instructors in psychology, 4 failed to answer, and 17 gave answers to the effect that some provision was made. These answers, because of their great variety, are presented verbatim as follows:

GROUP A

"Traveling expenses paid by college for all instructors who read papers at conferences."

"None, unless a paper is given."

"Traveling expenses of members of the faculty are paid at times by the University, so as to make it possible for them to attend national and state conferences."

"Learned Society Fund for Members of University Council."

GROUP 3

"Paid by the institution."

"College pays one-half of expenses."

"One-half of expenses, if on program; one-third of expenses, if attendance only."

"An appropriation by the college provides for part traveling expenses."

"This is entirely in the hands of the president of our institution."

GROUP 4

"One-half fare and Pullman."

"Expenses to one meeting per year."

"One thousand dollars is set aside each year to pay the traveling expenses

of heads of departments, and both last year and this year (to the World Congress at Yale) my associate, Professor Sharp, was taken care of, too."

"The administration pays the expenses of instructors who desire to attend psychological conferences."

GROUP 5

"Traveling expenses allowed to extent of two-thirds transportation; comes from department budget. Attendance at conferences encouraged."

"Half of such expense, when trips are approved by the president."

GROUP 6

"Expenses are paid out of current funds."

"Adequate provision."

SUMMARY AND CONCLUSION

1. The present survey was undertaken as one of the initial steps towards the realization of the aims of the Psychology Section of the Ohio College Association as expressed in its constitution.

2. Out of fifty colleges originally appealed to, 47 agreed to coöperate. Of these, 39, or 83 per cent, actually coöperated to a greater or lesser extent.

3. Answers were sent in by 144 instructors which includes 98 per cent of all instructors of psychology in the colleges participating.

4. It was found from the information obtained that the median age for men is thirty-nine and for women thirty-eight; 22 per cent of all instructors are above fifty years of age.

5. There are apparently great variations in the positions, titles, or ranks held by the instructors at the various institutions.

6. Less than 50 per cent answered the question regarding the number of teaching hours per week. For those who answered, the median for men is 10 hours per week and for women 6 hours per week.

7. The median number of years of teaching experience for the men is 4.5 and for the women, 5.5 years.

8. The large majority of teachers have entered directly into the field of psychology or have come from closely related fields.

9. Of fellowships, scholarships, and assistantships held by the instructors during their training periods, 21 per cent have been furnished by Ohio State, 11 per cent by Columbia, and 8 per cent by Chicago.

10. The median number of years that the teachers have been in their present positions for men was 3.1 and for women, 1.5.

11. A large variety of psychology courses are regularly taught. Sixty-two per cent of the instructors teach a course in introductory psychology and 45 per cent teach educational psychology.

12. During their academic preparation 60 per cent of the men and 6 per cent of the women have earned the Ph.D. degree. Twenty-six per cent of the men and 64 per cent of the women have as their highest degree only the M.A. or M.S. Of the Master's degrees 33 per cent have been granted by Ohio State. Of the Doctor's degrees 19 per cent have been granted by Ohio State and 15 per cent by Chicago.

13. Judging from their major professors the per cent of the Ohio psychology teachers who took their degrees in the various fields are: experimental psychology, 36 per cent; educational psychology, 29 per cent; clinical psychology, 14 per cent; education, 13 per cent; and industrial psychology, 8 per cent.

14. Of all the instructors only 71 per cent have taken a course in experimental psychology during their training period.

15. The natural sciences seem not to have had as much emphasis in the training of the teachers as have education, mathematics, and philosophy.

16. For 8 teachers holding M.A.'s the median number of publications was 2.5; for 35 holding Ph.D.'s the median was 7.5.

17. The median estimated number of clock hours of laboratory work done by the teachers during their training periods for the men was 212 and for the women 175.

18. For 37 teachers who reported that they were teaching experimental (laboratory) courses the average number of teaching hours per week in such courses was 3.4.

19. Fifty-five per cent of the instructors teach during the summer, 30 per cent use their summers for academic development, and 8 per cent spend a portion of the summer vacation doing research.

20. The questionnaire regarding laboratory and library facilities in the department of psychology was answered by 36 colleges.

21. In this part of the survey all data are presented for various groups of colleges according to size of enrolment.

22. The total replacement value of laboratory apparatus and equipment for all Ohio colleges was $126,620. This makes an average of $6,331 for the 20 colleges who indicated values of apparatus and equipment. Averages for colleges of various size of enrolment are given.

23. The total amount of annual funds available for laboratory equipment, books, and journals in the colleges was found to be $17,783. This makes an average of $574 for the 31 colleges who indicated that they had funds. The 6 largest colleges in Ohio have 58 per cent of the total amount.

24. The sources of available funds include general college funds, fees and tuition of students, library fund, and state appropriation.

25. A great variety of pieces of apparatus considered as important was mentioned. The list included plethysmographs; psychogalvanic apparatus; aesthesiometers; color apparatus; models of brain, eye, and ear; mirror drawing outfits; and various chronoscopes.

26. It was found that use is made by departments of psychology of apparatus borrowed from such departments as physics, biology, and education.

27. Judging from the number of colleges who gave amounts of floor space available for laboratory use, it appears that 21, or 58 per cent, of the 36 have psychological laboratories. The average amount of floor space available for these colleges is 1,969 square feet.

28. The average number of psychological books in the libraries of the various colleges is 676. The median number of journals taken is 4.4.

29. Fifteen colleges reported the use of tests for entering freshmen. Other uses mentioned were: in test and measurement courses, in connection with teaching, in educational and vocational guidance work, in research, and in clinical testing.

30. In 33 per cent of the colleges educational psychology is taught in the department of psychology and in 53 per cent it is taught in the department of education.

31. Seventeen colleges, including both small and large ones, indicated that they have plans for increasing their laboratory equipment. Ten colleges mentioned special needs for new or extended facilities.

32. In seventeen colleges provisions of varying nature are made for traveling expenses of psychology instructors who desire to attend psychological conferences.

The above suggestive results may serve as an indicative background for the Psychology Section of the Ohio College Association for the formulation of tentative standards in regard to qualifications of teachers, library and laboratory equipment, and course of study, for colleges of various size of enrolment.

The fact that the questionnaire from the very outset stimulated institutions and individuals to write in to the Psychology Section for advice is in itself gratifying.

In spite of all the limitations inherent in our questionnaire method (although the answers are obtained from psychologists at the request of the administration) it is our hope that at least some of the results may prove also of value for the teaching of psychology in general.

A GENERAL REVIEW OF THE LITERATURE ON HYPNOTISM AND SUGGESTION

BY PAUL CAMPBELL YOUNG
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I. Introduction

The last general review of the literature of hypnotism and suggestion was made by the author (**130**) in this journal, 1927, 24, 540–560, and consisted of 136 different references to material appearing for the most part prior to January, 1926. The present survey is confined largely to books and articles appearing from January, 1926, to July, 1930. Within this space of time so many articles have been published, especially in German, that it will be impossible even to refer to them all by title. Covering the period between the last dates mentioned, the reviewer has notes on 66 different books and 233 separate articles dealing entirely or clearly with hypnosis and suggestion. Of this number the Germans, Austrians, and Dutch are responsible for 15 books and 112 articles; the Americans for 17 books (including several texts on abnormal psychology) and 60 articles; the English for 16 books and 22 articles; the Russians and Poles for 5 books and 12 articles; the rest being scattered. The revival of hypnotism that Janet (**55**) prophesied is coming; in Germany and the rest of northern Europe by way of the hospital clinic and the physiological laboratory, in America by way of the psychological laboratory.

2. Historical and General Reviews

The first 340 pages of Volume I of Janet's (**55**) great "Psychological Healing" deals almost exclusively with the history of hypnotism and suggestion. In it Janet shows (as do Murphy, **81**, and Boring, **8** in smaller compass in their more general histories) the debt that modern psychology owes to the movement that first crystallized around the Mesmerists. This quotation from Janet is worth interpolating here: "It is a remarkable fact that Charcot, whom the public believes to have been an arch-hypnotist, never hypnotized any one." Really his assistants hypnotized all the patients whom he used in demonstrations. Tischner (**118**), in a monograph, treats in detail the life and work of Mesmer. Both Tischner and Janet point out the

the indebtedness of Mesmer to the Scotsman, Maxwell. The general tests on hypnotism and suggestion might well be considered historical treatments. Among these books are new editions of Bramwell (9) and Hirschlaff (44), and new books by Hollander (46), Benussi (3), and Roasenda (100). Taylor's (116) exposition of Prince's work and Prince's (95) articles in collected form both have value in this regard. Novel treatments of the hypnotic phenomena have been offered by Schilder and Kauders (105) from the psychoanalytical point of view and by Rosenow (103) on the observational level. Lichtenberger (72), in a French journal, gives a general review of the literature from 1895 to 1924; Klemperer and Weissmann (64), as well as Heilig and Hoff (40), review the work on organic changes produced in hypnosis, and Hoagland (45) and ten Cate (117) review some of the literature on animal hypnosis.

3. Occult Hold-Overs

In spite of time and derision the old notions that hypnosis brings with it mysterious powers, such as clairvoyance, telepathy, and other manifestations linked up with the theory of animal magnetism, still persists. Jewett (57), in a twenty-nine page pamphlet, gives details of thought reading, failures resulting only in cases in which the participants had not had alcoholic drinks. Tischner (118) seems to favor the occult interpretation of some of Mesmer's work. Stowell (113) and others took oath to the effect that they had, under the auspices of a fakir near Bombay, walked through blazing embers for a distance of twelve feet, the flames two or three feet high, without shoes and socks, and felt nothing. By means of the hypnotic trance Pagenstecher's (88) subject could tell past events that had to do with objects shown to her ("psychometry"). Unfavorably to the contention of Alrutz (2) that mesmeric passes without the subject's knowledge exert influence on the body, a committee among whom were van Loon (121), Janet, Zwaardemaker, and McDougall, found nothing of "nervous effluence" in the mesmeric demonstration made by Gustaf Wallenius, a coworker of Alrutz. This test was made during the Eighth International Congress at Gröningen. Polinkovsky (92), who repeated the experiments of Alrutz, procured only negative results.

4. Technique

Many experimenters lately have emphasized the need for flawless, controlled experimentation in hypnosis. When Hull (47) states, "It is scarcely an exaggeration to say that the present state of hypnotic

knowledge is a scientific scandal," he has reference to the lack of exact controlled experimentation which was deplored in the reviewer's survey, "Hypnotism" (131), and which has been emphasized by F. L. Wells (125) in his demand for a multiplicity of controls, since "there is hardly more treacherous ground in experimental Psychology." But this problem has also been envisaged by certain Germans (mainly clinical) experimenters, notably by Dattner and John (15), some of whom, judging by their reports, have for some time used as much skepticism and caution in ordering their experiments as have the most careful psychologists in this country. The Germans and Scandinavians, mainly, have been getting controlled experimental results in regard to blood pressure, metabolic rates, temperatures, etc. Hull (47) has done much toward making definite and quantitative the investigation of hypnosis and suggestion, and has described an apparatus for measuring suggested postural movement. Moreover, in order to make available to all psychologists in this country an apparatus for giving objectively uniform suggestions both in waking and hypnosis, Hull and Krueger (50) have put suggestions in regard to postural movement upon a phonograph record. This development was independent of that made by Estabrooks (21) who has recorded on a Victrola record suggestions which are to put the subject to sleep and wake him up, or transfer the rapport in case an operator is present. These machines, while representing steps in the right direction, are as yet untested by others; but if they prove effective, they will have a good deal to do with defining the nature of hypnosis and suggestion, working as they do without the strong personal element so much stressed in some theories. In contrast with the just mentioned attempts at standardizing the hypnotic technique, is a method detailed by Ivanov-Smolensky (52) in which the induction of hypnosis is mechanized. The subject is told that he is to undergo a light-therapy procedure, and is asked to lie on a couch. Thereupon the doctor goes into a neighboring room from which he can observe the subject and can manipulate the mechanical hypnotizer. When a bell rings, a light which gives out some warmth swings back and forth over the subject, from head to foot. The warm light and the soft sound of the swinging lamp soon put him to sleep. Later on, the bell alone suffices.

In spite of what late experimenters, especially Hull (47) and his associates, have said about the demands for a flawless technique, a general adverse criticism of their work as well as that of others seems valid: there are not enough periods of experimentation in the waking

and hypnotic states to obviate chance and other non-conclusive factors. Stronger strictures than this are leveled against the work of the Wisconsin group (Hull and others) by Stein (112), including the charges that *suggestion, suggestibility,* and *trance hypnosis* are not defined, and an index of undefined *suggestibility* is chosen and used with bold certainty. Other objections to the scientific validity of Hull's work made by Stein and the reviewer will appear later when the individual researches are taken up.

5. Experimental Results

A. *The comparative capacity of the subject in waking and in hypnosis.* Hull and Huse (49), using 8 subjects, obtaining 2 scores from each subject in waking and 2 in hypnosis at 4 different experimental periods (making 128 scores in all) investigated the comparative suggestibility in the trance and waking states. As the test of suggestibility he used the well-known tendency of a blind-folded person to fall if the "experimenter stands before him and repeats in a quiet, confident tone, 'You are falling forward, you can't help yourself, you are falling forward, forward, forward,' etc., continuously during the suggestion period." Since almost always the subject fell entirely over, and was caught by the operator, the amount of deflection shown on the kymograph record was neglected and the times taken to give a maximum response was accepted as the standard of suggestibility. The results showed that "waking suggestion requires something like 2½ times as much time as trance suggestion." A corollary result was the cumulative effect: "The indication is that under the conditions of the present experiment the suggestion time of the second of two suggested responses is reduced by approximately a fourth. There is no evidence that the trance differs at all in this respect from the waking condition." The criticism already made that the small number of experimental periods militates against the validity of most of the otherwise scientific researches, has double weight here: if the time was decreasing by one-fourth when only two suggestions were given in a session, it would have been interesting to see what result the eighth or tenth suggestion would have had. Another, technical, flaw is that the experimenters did not hold to their single criterion. Subject M. did not fall over on three occasions; but, instead of throwing out these results, the experimenters interpolated some figures. Whether the test of falling forward at command is a real test of suggestibility is open to question: it is certainly a test of carrying out orders, or of coöperation. It may be a means of inducing suggestibility. Furthermore, it is not certain

that suggestibility can be measured by the speed with which the person reacts, even in this artificial situation. Other criteria, as for example the phenomena elicited in hypnosis, the reports during and after hypnosis, might help to clear up this point, *i.e.*, whether impulsiveness is a criterion of suggested behavior. The objection that Stein (**112**) makes against the procedure here described has some weight, namely, after the person has swayed to a certain extent, the pull of gravity and not the effect of suggestion is being measured.

By testing the effect of hypnosis on muscular fatigue under very good technical conditions, Williams (**128**) cast great doubt on the work on the same matter by Nicholson (**86**), and came to the conclusion that "there is an increase (avg. 16 per cent), varying with different subjects in the work done in the trance as compared with that done in the waking state when equivalent positive suggestions are given in each," but that "merely being in the trance state does not prevent the onset of fatigue." However, the feelings in regard to pain in the two states even with equal objective fatigue were different. The crucial instruction was the same in both states, "There will be no fatigue of your arm and finger and you can make a good record." Five subjects furnished 68 different measures (34 in each state), on which the conclusions were based. From a later study of voluntary and hypnotic catalepsy, the same author (**127**) concluded that although the eight subjects were unable to hold up their arms longer in the trance than in the waking state, they did not report any fatigue.

A well thought out study by Ramona Masserschmidt (**78**) using three subjects in post-hypnotic sessions showed that co-conscious phenomena, such as reading and adding, instead of going on without mutual interference, as Prince (**94**) and Burnett (**13**) had reported and many persons like Watson (**123**), had doubted, encountered so much resistance that, in a typical case, "there not only is an interference such as would be produced by an alternation, but considerably more." It needs to be pointed out that in spite of these results, the fact of co-conscious activity is not disproved, because the subjects all seemed to have been unconscious that they were carrying on two processes. Even though they sensed their poor performance, they could not explain it. A task which the experimenter did not set herself, but one which would have thrown much light on the efficiency of the post-hypnotic performance, would have been to determine how well the same subjects could have done the simultaneous reading and adding in ordinary waking consciousness.

The amount of post-hypnotic amnesia was determined quanti-

tatively by Strickler (114) to be 50 per cent for relearning amnesia and 80 per cent for recall amnesia.

In Kellogg's (62) research to measure the duration of the effects of post-hypnotic suggestion, the suggestion was that while reading the even-numbered pages of a book, the subject would breathe twice as fast as usual, and when reading the odd-numbered pages he would breathe twice as fast. These orders were given, along with some practice in fulfilling them, to one group of subjects in the trance, and to a group of control subjects as simple waking instructions. With such an emotional response as altered breathing linked up, without any real conditioning, to poems that were boring to the subjects, it is no surprise to the reviewer that "The records of the trance subjects show a sharp fall during the first few weeks, while the records of the normals show a corresponding rise, in some cases to ratios exceeding the one suggested." Stein's (112) criticism of the just preceding study by Strickler holds of this one also: "This experiment deals with emotionally indifferent characters and symbols. The results cannot be applied therefore to amnesia for emotionally significant experiences such as those found in the clinic." Nor can they be applied to life. Even a psychological experiment ought to make the reaction fit the stimulus. The results might have been quite different if a technique such as Deutsch's (17) had been followed, namely, linking the dropping of a handkerchief to a state of excitement in hypnosis, and then measuring the bodily disturbances brought about by dropping the handkerchief in the later amnesic waking state.

All the above researches were sponsored by Hull at Wisconsin. There are few other published records in regard to suggestion and hypnosis that compare with them in psychological care and foresight. One such is that by F. L. Wells (125), in which he compared the ability of one subject in waking and in hypnosis in reaction times, achievement capacity (G. G. Fernald), memory, tapping, and substitution tests. On the whole the hypnotic performance seemed somewhat better than the waking performance; but the noteworthy part of the study is that, here again, the subject reported the absence of fatigue at tapping and that an hypnotic suggestion to forget given to this subject, "who could be 'put to sleep' with a wave of the hand" was *not* obeyed. Koster (66), with 21 patients as subjects in a well-planned and well-executed investigation, determined that hypnosis alone brought about in two-thirds of his subjects a lowering in muscular strength and in discriminative ability; whereas hypnotic suggestion of augmented ability brought about sharp increases in

muscular strength in two-thirds of his subjects, but brought increases in discriminative performance in only one-third of the subjects. From Koster's article it seems that the effect of post-hypnotic suggestions was somewhat greater than that of suggestions carried out in hypnosis. He attributes the failure of the hypnotic suggestion to register increases, to the patients' preoccupation with their illness. This explanation should be compared with that of Travis (**119**) and Rosenow (**103**), both of whom seem to think that a certain amount of preoccupation makes easier the carrying out of suggestions.

B. *Experiments which lack the stamp of a rigorous comparative method, or in which technique is not definitely stated.* Experiments of this sort conducted by Robinson (**102**), Lifschitz (**73**), Hadfield (**35**), Fisher (**26**), and Benussi (**4**) resulted in very great increases in the hypnotic performance. Robinson found that a rather frail young woman in hypnosis could hold up her arm without trouble long after several of the more robust men in the class had succumbed to the pain engendered in the conscious effort to outlast her.

Lifschiftz's experiments on hearing, with 41 normal subjects, were made with a telephone arrangement and were measured by a galvanometer. The results of suggestion were as follows: in waking, a lowering of the threshold on the average of 65 per cent; in the mildest stage of hypnosis (somnolence) a lowering of 200 per cent; in the next stage (hypotaxy) a lowering of 315 per cent; and in somnambulism a lowering of 1355 per cent. Then Lifschitz turned around and made these lowered thresholds the criteria of the suggestibility of the four states of consciousness mentioned. Hadfield's three subjects, when told to grip the dynamometer as tightly as they could, made scores of 101 pounds in waking, of 29 pounds in hypnosis working under the suggestion that they were weak, of 142 pounds in hypnosis working under the suggestion that they were very strong. Fisher says that "One of the writer's subjects was able to hear the ticking of a watch at fully twice the distance, when under hypnosis, that she could in the waking state." Benussi reports, among many other results, much greater ability in hypnosis to reproduce a series in backward order.

C. *Experiments on suggestions in group situations.* Among the many experiments carried out with the purpose of testing suggestion are the following which have to do with group situations. Reynolds (**98**), by testing 229 children ranging in age from one year nine months to five years six months, found that negativism tends to decrease with increase in chronological and mental age, even though

the I.Q. and negativism are not significantly correlated. Popov's (93) results go further in this direction: he found that suggestibility decreased with age in the 580 children he studied, and that the boys were more suggestible than the girls. Of like tenor are the results published by McGeoch (83): intelligence and suggestibility show a small negative correlation. Contrasted with these results are those of Young (132), working with 637 children; he found no difference in suggestibility between nine and ten year old children, whether they were negro or white, even though the negroes proved to be much less intelligent and much more suggestible as judged by the tests given; and those of I. C. Sherman (109), who ascertained that with 65 children between six and sixteen years of age verbal suggestion was most effective with the youngest and the oldest. Cushing and Ruch (14) found a group of delinquent girls to be about as intelligent as a normal group, and less suggestible. Heron (43) and Lodge (74), both using the Seashore warmth apparatus, proved women to be more suggestible than men in this test.

According to Naumov (85) 125 insane persons were four times as suggestible as a control group of 50 adults, with children intermediate in the trait. The work of Fernberger (25), Jarden and Fernberger (56), and M. Sherman (110) showed that judging some facial expressions without knowing the social setting involved is mostly a matter of chance, but that in these cases suggestions, whether true or false, bring about a consistency of choice consonant with the suggestions given. The first two used certain expressions of the Piderit model; the last used moving pictures of emotional responses of babies. Farnsworth and Beaumont (24) turned pictures of indifferent merit into either masterpieces or mediocre studies for subjects who judged the worth of the pictures from the descriptions that accompanied them.

D. *Miscellaneous experimental results.* Except for the fact that Hoagland (45) seems on the way to finding that a hormone, perhaps adrenalin, is responsible for the so-called animal hypnosis, there is little new to report in this special field; though ten Cate (117), Reisinger (97), and Robimarga (101) have rediscovered the facts, and published them in several articles, only one from each author being referred to here. Bonte (7) and Schroff (106), in investigating imagination, found that suggestibility and eidetic imagery are closely related; the latter going so far as to say that a great many of the so-called eidetic images are merely after-images that have been made to appear as eidetic images through suggestion. Benussi (4),

in 1927, reported hynotically induced dreams which he studied as *bona fide* dreams. Then, in 1928, Nachmannsohn (84) detailed his plan of arousing hypnotic dreams and analyzing them. Lately, Klein (63) has published in detail his experiments on several subjects, who were told in hypnosis to tell any dreams they might have as soon as they were over. Although this wording of Klein's is better than Benussi's "Traumen Sie," in either case it is doubtful that the resulting process is what it seems to me. The just preceding situation is certainly different; the purpose of the real dreamer is most likely to keep on sleeping, the purpose of the hypnotic subject is very likely to dream for the operator; and the definiteness of the stimulation in hypnosis is in contrast with the vague mass of stimuli coming in sleep. Even so, the results of Klein are interesting: the existence of typical dreams, *e.g.*, of falling, and of smothering, was confirmed; Freudian dreams constituted only one-tenth the total; and the purpose for which the research was projected, namely, the substantiation of Hollingworth's redintegrative theory of thinking, was fulfilled.

6. Organic Changes in Hypnosis

It is exceedingly hard for any but a physiologist to evaluate the worth of the great number of investigations of the visceral responses, undertaken for the most part by the Germans and the Scandinavians. The reviews made by Heilig and Hoff (40) (with the citation of 4 articles in English, 1 in French, and 63 in German) and by Klemperer and Weissman (64) (with the citation of 1 article in English, 2 in French, and 24 in German) constitute the main basis of comparison. Judging mainly by the opinion of these reviewers, who consider as free from scientific error some of the work now to be reported, the present reviewer would say that the two shortcomings of most of these researches is the lack of an extended comparable test in the normal state, and, what is more patent but not mentioned by the German reviewers, an almost exclusive use of clinical patients as subjects. Klemperer and Weissmann state that little is known of the effect of bare hypnosis upon the organic functions.

A. *In the digestive system.* Gigon, Aigner, and Brauch (30), Hansen (38), Delhougne and Hansen (16), Marcus and Sahlgren (76), and Schuster (108), in individual experiments much alike except that the last named really anesthetized the organs of taste and smell, came to the conclusion that the effects of a suggested meal or a suggested drink of sugared water or a suggested injection of insulin (all in hypnosis) result in secretions such as would be produced by an actual meal or sugar or insulin. In corresponding

fashion, the effects of the actual drinking of sugared water or taking of insulin can be largely counteracted by the proper hypnotic suggestions.

B. *In the circulatory system.* These will be merely listed. Helmut and Marx (42), by suggesting that the subject was drinking water, induced the same blood curve that water itself would produce. Through rest suggested in hypnosis, Glaser (referred to in Klemperer and Weissmann, 64) lowered the lime content of the blood. According to Moos (79), changes which were considerable, but which varied from person to person, could be brought on by suggesting frightful or restful emotions. Heilig and Hoff (40) refer to work by Deutsch and Kaufmann and by Kirchberg, which are contradictory in their results; Deutsch and Kaufmann reporting an increased pulse rate and a state of affective tension in hypnosis as such, apart from positive emotional suggestions; whereas Kirschberg found both the blood rate and the respiration rate lower. Although Schazzillo and Abramov (104) claim that their results show alteration through suggestion of the calcium-potassium ratio in the blood, and a lowering of the calcium content, their published results do not bear out the contention. They report an increase in the tonus of the sympathetic system as a result of suggesting happy emotions and a lowering of the tonus of the vagus system as a result of inducing unhappy emotions. When Klemperer and Weissmann (64) suggested that their subjects were being hurt by fire, the subjects " play-acted " the part, with great changes in the rate of breathing, but looked-for changes in the rate of the pulse did not take place, nor was the O_2 and CO_2 content of the blood changed beyond what might be attributed to effects of expectation on the part of the subjects.

C. *Miscellaneous organic conditions.* As regards metabolism tests, Heilig and Hoff (40) report results of the work of Grafe and Mayer (which the former characterize as very exact and cautious), showing that with the suggestion of pleasant emotions in hypnosis there is an increase of 4.1 per cent in basal metabolism; with suggestion of unpleasant emotions an increase of 7.6 per cent. Deutsch (17) found that the basal metabolism rate is lowered about 13.6 per cent when suggestions of complete rest are given in hypnosis, as contrasted with the lowering in natural sleep amounting to 7.8 per cent, and in keeping with the lowering of 26.6 per cent (below normal resting states) following the suggestion of a train accident. Heilig and Hoff (40), who seem quite critical in their methods, were able to change the amount and the constitution of the urine by the hypnotic suggestions of pleasantness or unpleasantness.

In this country, Estabrooks (**22**) studied the results of hypnosis upon the psychogalvanic reflex. He thus verified the findings of Benussi (**4**), who has done much work on various aspects of suggestion, namely, that in hypnosis as in normal sleep, the gross resistances tend definitely to increase. This fact, Estabrooks says, may give us an objective measurement of the depth of hypnosis. He further noticed that "once a good subject is more or less used to a certain operator, his resistance will tend to increase with the mere presence of this operator. This increase appears to be quite distinct from any condition resembling sleep or the hypnotic trance as it is generally understood." Estabrooks reports a most interesting case for a theory of hypnosis. One subject, who had previously been offended "took part in this experiment with the mental reservation that, so far as he was concerned, there wasn't going to be any hypnosis. Actually he was master of himself throughout, broke every test for control except closure of the eyes, and seemed very well satisfied with his performance. For all that, his resistances, for some curious reason, gave the typical hypnotic reaction." This incident might link up with the facts reported by the reviewer (**133**): that a subject can at will submit to hypnosis and yet "be out of rapport with the experimenter and come back into rapport only if, as, and when he had determined before he was hypnotized."

D. *Methodology.* A word should be said about the suggestive technique for bringing about organic changes. Definite suggestions are given; *e.g.,* one does not suggest that the subject's thyroid should become active, but that the patient is angry. As Eidelberg (**20**) says: "Hypnosis does not cause the bowel movement, but the sense impression which is aroused through hypnosis does it." Because of the great number of positive results reported, it is good to see that several of those who accept as *bona fide* the researches of some others in bringing about organic changes, themselves have only negative results to offer. So, Eidelberg (**20**) has the following to say of others: "The effect of hypnosis upon sense impression has been demonstrated with this method (*i.e.,* with measurement by means of apparatus) in a manner free from objection. Here belong the researches of Deutsch and Grafe upon metabolism; Heilig and Hoff upon gastric secretions; Bauer and Schilder upon bowel movements, and many others." But in his own effort to induce a narrowing of the pupil by a suggestion of brightness, he met only with failure. He explains this by the hypothesis that "those phenomena, which can be produced by excitement of the sense organs without corresponding images, cannot be produced merely through suggestion of the cor-

responding sense impressions." Dattner and John (15) go even further in their skepticism. Having for the most part got only negative results themselves, they declare: "We cannot be converted to the view that suggestion can accomplish much more than the subjects could accomplish with corresponding effort of will." They emphasize strongly that before any superior performance can be accredited to suggestion a thorough-going set of control experiments must be run.

7. Medical Uses of Hypnosis

The foregoing reports of great organic changes brought about in hypnosis seem in general to be verified from another source: the multiform uses of various forms of suggestion in medical practice. In the face of the very wide acceptance of suggestion as a *bona fide* therapeutic agent in Germany and other northern European countries, its continued unacceptability to the American medical men is remarkable. In Germany nearly every meeting of psychotherapists finds one or more reports of cures through hypnosis, made by respectable practitioners, who lose no prestige thereby. In this country, on the rare occasions that a doctor reports the use of hypnosis, he is looked upon as a thaumaturgist (111). Hypnosis is only a little less taboo in England than in this country. By way of poking fun at these doctors who are superior to the use of hypnosis, Janet (55) says, "It has been my tendency, my misfortune perhaps, to have a fondness for moderation, and to dislike the absurd exaggeration of extremists. That is why, twenty years ago, I exposed myself to contempt by saying that hypnotic suggestion was not everything: and that is why, to-day, I run the risk of making people laugh at me by saying that hypnotism counts for something after all. . . . If my book be ignored to-day, it will be read to-morrow, when there will have been a new turn to fashion's wheel, bringing back treatment by hypnotic suggestion just as it will bring back our grandmother's hats."

A. *Suggestion as a general method.* The following use hypnosis as a part of the general analysis of mind, finding it a great aid in the revival of hidden experiences and in the resolution of the conflict: Levy-Suhl (71), Maeder (75), Hackländer (34), Prince (95), Dillon (18), Hadfield (36), Brown (11), and Jablonowski (53). The last named uses a combination of narcosis and hypnosis, "narcohypnosis," in order to "break the shell of the unconscious." Roasenda (100) recommends the use of suggestion in an eclectic method in combination with persuasion, and medical and physical

therapy. Among those who have elaborated a special method of treatment around suggestion are Schultz (107) and Kogerer (65), who use conscious autosuggestion in bringing about relaxation and redirection of the organic functions, thus influencing the very nature of the person. Others, including Isserlin (51) and Trömner (120), use hypnosis to negate the symptoms of certain diseases, in this way really curing the person. As Trömner remarks, there are two ways to kill a plant: one is to dig up the roots, the other is to destroy the top. Often the relief of the symptoms changes the whole "autoplastic sickness-picture."

B. *In nervous and mental diseases.* To go into detail about the recent cures of various diseases through hypnosis and suggestion, would be too much for this review. Among the many who treat nervous and mental diseases by this means are: Brown (11), who states that of 600 cases of amnesia, every one was cleared up by hypnosis, and that "in hysteria, suggestion treatment, with or without hypnosis, may be a quick and satisfactory method of improving the patient's mental condition, and of enabling him to achieve greater powers of mental synthesis for himself"(10); and Fitzgerald (27), who for years has used a light form of hypnosis for mental patients who come to him in his general practice. A few others who belong here are: Vinchon and Desoille (122), Nachmannsohn (84), and Kauders (61).

C. *In clearing up the psychic components of organic disease.* This application is familiar enough; but Laudenheimer (69), Friedenthal (28), Friedländer (29, and Jacobi (54) report cures in treating asthma; in which cases, apparently, only the success or the failure of the suggestive treatment indicated the organic or functional nature of the disorder.

D. *Gynecological uses.* In the last review, the use of suggestion in gynecology was treated in some detail. To all appearances the popularity of this treatment has not decreased. For example, Wolff (129) uses narcohypnosis in inducing birth analgesia by the following means: fourteen days before delivery the woman is called in, put into a deep hypnotic sleep by the aid of a modicum of narcotic and given suggestions preparing her for the crisis. If, with three or four more sittings, the doctor has been unable to induce amnesia and analgesia, the patient is unsuitable for this technique. If they have been produced, suggestions of analgesia during the birth process are given. At the time of delivery the doctor must be present to induce the state of analgesia with the aid of the small dose of narcotic and

to give a larger dose in case of complication. For normal women who are susceptible to hypnosis this method is recommended as the best.

E. *Dermatological applications.* Remarkable cures in the domain of dermatology have been reported lately from reliable sources. Bunnemann (12) says that he was the first to treat skin affections by a definitely scientific psychotherapeutic method. He not only cures warts, itch, eczema, ecchymoses, etc., but by bringing back these affections in certain cases, after a year has elapsed, he has shown their psychic origin. Similar proof of the psychic origin of some diseases was obtained by Heilig and Hoff (41), who, by suggestion of a psychic trauma and itching of the lips, brought on fever sores in all three subjects experimented with, subjects who had habitually manifested the physical symptoms in certain life situations. Bunnemann reports the cure of X-ray burns of years' standing in a surgeon, even though the surgeon was cognizant of the suggestive nature of the treatment. After Bunnemann, many others have obtained noteworthy results. Because his method is easy to sketch, the work of Bloch (5) in treating warts will be described. In two and a half years, Bloch has a record of 179 cases which have been followed up. Of these 54.7 per cent were cured. The treatment is as follows: After the patient has been blindfolded he is led into the operating room, where among other things he is treated to an electric shock, and his warts are brilliantly painted with a harmless coloring matter. He is then led back to the waiting room, the bandage taken off, and the fact impressed upon him that as long as one speck of color remains he is not to touch the wart. He is told to take complete cure for granted. Usually one or two treatments suffice, but the warts disappear only after a little time, commonly from four to eight weeks. Bonjour (6), in commenting on Bloch's work, does not question the results; he merely criticizes Bloch for resorting to thaumaturgy when he, Bonjour, has just as good results without the hocus pocus; in fact, he says that anyone can cure at least 95 per cent of warts and condylomas by bare verbal suggestion. Out of 18 cases of warts treated by Grumach (33), he reports only 2 cases unaffected, with 8 completely cured within 6 weeks, and 8 completely cured within 4 months. The method included an intramuscular injection of sodium chloride in the arm, along with the assurance that it was a new and effective treatment for warts. Grumach is from the Dermatological Clinic of the University of Königsberg, Bloch from the Dermatological Clinic in Burich, Bunnemann is a specialist of Ballenstedt. The psychological implications of these clinical results are many.

F. *In operations.* The last review mentioned the concerted movement toward the use of hypnosis in connection with operations, in order to lessen the amount of narcotic used. This movement seems not to have abated. Platonoff and Velvosky (**91**), professors at Kharkov, report 21 cases of various kinds of operations made painless either by bare hypnosis or by hypnosis with a small amount of narcotic. Solomon (**111**), in this country, performed a major operation in hypnosis. So did Etienne (**23**), in France, when he performed a trepanation and also when he removed the upper third of the diaphysis of the femur. Mayer (**77**) carried out a very painful orthopedic operation on a person who had once been narcotized and who wished to escape the nausea that had followed etherization. Pauchet (**89**) uses hypnosis in inoperable cases, in preparing the patient for an operation, and in post-operational care. Brown (**11**) finds that the use of hypnosis before an operation may prevent nausea afterward. The cases of operation in a state of pure hypnosis strike one as being somewhat bizarre and useful only in extreme cases, where operational shock might prove disastrous; whereas the use of hypnosis in preparation for an operation and lessening the amount of ether required, with the ether-can handy if needed, seems to be proof against objection.

G. *Minor medicine.* Karger (**60**) and Künkel (**67**) use hypnosis in treating bed-soiling; Richter (**99**) for stuttering, the only treatment according to him; Grebe (**32**) also for stuttering, because the instructions given in hypnosis carry more weight and because the correct attitude can be taken more easily and surely. Peabody (**90**) recommends suggestion, along with other means, in the treatment of alcoholism.

H. *General use and importance in medicine.* Olkon (**87**) says, "The physician has not the slightest reason to ignore suggestion. He should use it considerately and wisely." Goldwyn (**31**) gives hypnosis and the hypnoidal state value as anamnestic, diagnostic, psychognostic, psychopathological, and psychotherapeutic agents. Schilder and Kauders (**105**) declare that it has growing use as a "technical device within the frame of psychic treatment." All of this, it must be remembered, is quite apart from its use by the large school of autosuggestionists (of whose work one may read, mainly in the *Schweiz. Zsch. f. Angew. Psychol.*, without being entirely convinced). But, if the indication of suggestion and hypnosis are so wide, why are they not used more? Janet (**55**) says that in America the activity of Christian Science, New Thought, Osteopathy and other extra-regular agencies, all of which practice suggestion, accounts to some

extent for their neglect by medical men. Pauchet (89) says the reason is inertia and the fact that the technique is hard to teach and hard to practice, even though exceedingly effective. As already stated, however, in Germany the situation is different. In Germany texts on psychotherapy, suggestion, and hypnosis are given large place. According to Weinmann (124), at the University of Münich, experts in various types of psychological treatment, *e.g.*, psychoanalysis, individual psychology, hypnosis and suggestion, lecture at the university on their respective topics, so that the student may choose that type of therapy for which he thinks himself temperamentally fitted.

8. Miscellaneous Uses of Suggestion and Hypnosis

The results already mentioned illustrate the use of hypnosis in the study of the organic processes. This use is pointed out by Heilig and Hoff (40). Hypnosis has been recognized as an important agent in the study of amnesia, Hartmann (39); brain localization, Kulenkampff (68); the less easily accessible parts of the personality, Murphy (81); unconscious motivation, Morgan (80); the whole field of psychological problems, Benussi (4). Levy-Suhl (70), Read (96), and Benussi (4) see its value in demonstrating the Freudian mechanisms. Downey (19) uses the principles of suggestion to interpret the artistic effects as shown in the "aesthetic trance," and declared further: "It is evident from the examples that have been given that literature makes extensive use of various hypnotic devices. It does so with a two-fold result. It induces a rest-state, one of relaxation, with a lowered personal threshold, a condition which is often its own excuse for being; and it uses this state of reverie to impress upon the unduly suggestible subject lovely visions and wise reflections. One's imagination becomes hallucinatory." Class demonstrations of suggestion have been described by Taylor (115) and Rosenow (103). Taylor as a preliminary demonstrated ideomotor action by the use of the well known *pendule explorateur*. Then, having made the students raise their right arms and think intently how it would feel to have their arms come down with a bang upon hearing a loud noise, he starts them off spelling a word backward, whereupon the loud sound releases the response. Rosenow's experiment is as follows: the class is told to keep intently fixated on a visual stimulus; at the same time they are to keep their hands tightly clasped. The main thing, though, is to be sure to keep the object fixated. Then, when they are told that they cannot unloose their hands, they find that they cannot. Rosenow objects to calling this an example of suggestion and he

varies the experiment in order to prove his point. With the same general instructions as above, the experiment goes on as follows: "When I judge the time ripe I remind them of their instructions and tell them to pull their hands apart, omitting any suggestion that they cannot do so. In my experience the experiment succeeds about as well in this form as when the negative suggestion is employed." The reviewer would remark that since the students have done the experiment one way and proceed in the same way up to the point where the final challenge is made, they have a clear suggestion that this experiment is to end in the same way as it ended before. If this last experiment is done with subjects not used in the preceding experiment, the technique is still definitely one of suggestion, inasmuch as the order "Now open your hands" comes into a consciousness which is filled with what Brown (10) calls a neutral idea. The instructions to keep the hands clasped prevails even though the challenge this time is worded differently. This is a very good illustration of the theory of suggestion which emphasizes the indirection of the communication of the idea to be carried out. (*Cf.* Young, 135.)

9. Phenomena of Hypnosis

Rosenow (103) has given an original and valuable treatment of the various characteristics of the hypnotic state. For example, of post-hypnotic amnesia he says, "Thus the individual does not forget that his arm was in a horizontal position for a long time. He never knew it, any more than I knew a moment ago that I was sitting cross-legged." Rapport becomes coöperation with the operator: "I conclude on the basis of this evidence that this characteristic, tense coöperative aspect is the supremely interesting aspect of hypnotic experience." The subject is too intensely interested in visualizing and believing what he is being told, to notice that he is doing it; all because he does not know what he intends to do, namely, coöperate with the operator in trying to go to sleep. This theory, however, would not account for the spontaneous dreams and the apparent negativism of some subjects in hypnosis.

The essentiality of rapport to genuine hypnosis has been dealt with by the reviewer in two papers (133 and 134) reporting an experimental study in which it was found that when another instructor at the university coached the subjects in giving themselves auto-suggestions the subjects could by making up their minds beforehand exhibit any degree of rapport. In criticizing these findings, Fisher (26) asks, "Can we find any comparable reason . . . for

the subject's deciding not to obey certain suggestions? Certainly. They were instructed to do so by the experimenters. Thus we are led to infer that a certain degree of rapport was established even before the subjects were hypnotized," etc. If the original article had made it clear that the person who coached the subjects in giving themselves autosuggestions never hypnotized them, this misunderstanding of Fisher's would not have arisen.

10. The Relation of Suggestion to Hypnosis

This article has dealt with hypnosis and suggestion together, treating them as interdependent facts, in spite of the very strong objection on the part of some writers to this conception. W. R. Wells (126), for example, says that "the condition of hypnosis, and especially the problem of its induction, would be apprehended more accurately if it were regarded as unrelated, if not actually opposed, to ordinary suggestion." So, too, Janet (55) says that "The hypnotic state is not characterized uniquely by suggestibility, for there are certain hypnoses in which suggestibility is, on the contrary, diminished and appears to be less than during the waking period." Brown (11) and Prince (94) have expressed themselves in about the same way, but they both point out that suggestion may bring about hypnosis. According to Prince this divorcement of hypnosis and suggestion is due to the fact that in hypnosis endopsychic factors are often stronger than external influence. As the reviewer (130) has pointed out, the facts mentioned by Janet, Brown, and Prince incline to the theory that in hypnosis the autosuggestive factors may be stronger than the heterosuggestive. The general conception, of course, is that suggestion induces hypnosis and is itself thereupon strengthened. (*Cf.* Brown, 11.) Although Rosenow (103) uses the term suggestion in describing the conduct of an hypnotic demonstration, in explanation he discards the notion of suggestion along with that of dissociation, repression, and others; because "I submit that these terms are utterly unintelligible and, at best, serve only the purpose of superficial description. I propose to discard them all without producing any terms to take their place. I propose to show that the phenomena are the result of the meaningful behavior of the hypnotized individual in ways which the individual does not understand. As long as the psychologist does not understand them either, he will have need for some of the terms enumerated above. After he has come to understand, he will have no further need for them." However, concepts of suggestion and hypnosis are so close-knit in the minds of most

psychologists that it will take more plausible analysis of both terms than has yet gained currency to eliminate the suggestive element from our conception of hypnosis.

11. Autosuggestion

Although the relation of suggestion and autosuggestion is still in debate (*cf.*, the last review) the status of autosuggestion as a *bona fide* phenomenon seems to have been established. The psychoanalysts have always been inclined to think of autosuggestion as more fundamental than heterosuggestion (Jones, **58**, and Jung, **59**). Even McDougall (**82**), who has been inclined to deny a place to non-pathological autosuggestion, writes of autosuggestion in the Fourteenth Edition of the Encyclopedia Britannica without once claiming that it is really a form of heterosuggestion. Although meaning different things, both Adler (1) and Rosenow (**103**) emphasize agreement on the part of the hypnotic subject to accept the operator's commands. Jung (**59**) says that "a suggestion is only accepted by one it suits"; Häberlin (37) that "Suggestion is only possible when it meets the active interest of the receiver."

12. Problems for Investigation

Hull (**47, 48**) has outlined in two different articles lines of research open to hypnotic investigation. These include a study of the various processes in hypnosis, *e.g.*, attention, imagination, spontaneous trances, etc.; of the methodology of hypnotizing, *e.g.*, a soothing or dominating manner, the use of drugs, prolonged suggestions, successive suggestions; of the nature of the suggestor, *e.g.*, prestige, sex, physical attractiveness; of the nature of the subject, *e.g.*, sex, age, "will," negative suggestibility.

Since those who are experimenting in suggestion have adopted the idea of a strictly comparable technique in the normal and hypnotic state, and since they are making use of the regular psychological and physiological apparatus, many of the problems of suggestion may soon be solved.

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MATERIALS FOR THE STUDY OF CREATIVE THINKING

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Introduction

Productive thought, especially as regards its technique and process, constitutes an island in the sea of psychological lore. Those who have sailed near it come away with tales of its rugged inaccessibility. For the year 1930 only two articles on creativeness appeared in the *Psychological Abstracts,* and these were trifling. There were no articles on *inspiration,* and none on *originality. Invention* and *discovery* received two slight discussions, one geographical and the other anthropological. *Genius* claimed twelve articles no one of which discussed the creativeness of superior minds. *Aesthetics* largely avoids the topic, and *psychoanalysis,* with the exception of two articles on the interpretation of literature, leaves the matter alone. It would seem futile to speak of a literature on the process of creative thinking.

Creative thought must be studied, therefore, through the materials which contribute to it from allied topics—philosophy, intuition, mysticism, literary criticism, art, invention, and genius. But in these, only scattered references exist, odd bits of material that must be pieced together before their significance becomes apparent. Such diverse material is by no means of uniform value, scholarship, or recency. Rather than compile a complete bibliography of such materials, we shall present representative and useful titles on which a new investigator may gain a foothold in the subject, either in the practical problem of fostering genius, or in the theoretical one of extending the work of psychological description.

General and Philosophical Works

Always there have been philosophical works bearing indirectly on the process and technique of productive thought. The problem of creation at once throws into outline the problem of freedom. Brightman (17) gives a summary of the literature, and shows how religion is in a sense creative. He holds (p. 179) that the stages of inspiration in creative thought form some analogy to the stages of worship in

religion, *e.g.,* reverent contemplation, revelation, communion, fruition. On the problem of freedom he cites standard works such as Bergson (13), Dewey, etc. (31), Alexander (3, 4, 5), and Morgan (88). These men forerun McDougall (81, p. 447f) in the belief "That the Human Mind in its highest flight creates new things, thinks in ways that have never been thought before, seems undeniable in face of any of the great works of genius." Peirce (110), and Driesch (39), and especially Müller-Freienfels (89) in *The New Rationalism,* wrestle with the problem of freedom in relation to the creative spirit. In general such contributions bear on the implications of creative thought for ethics, rather than on the technique of attaining creativeness itself. From a more practical standpoint Knowlson (65), and J. Harvey Robinson (121) (Chap. III, Sec. 5, pp. 48–62) illustrate how creative thought makes transformations in the world. With them, as with all these writers, there is no question of fact, merely disagreement as to the process and result; showing that in this latter direction lies the point of attack on a baffling problem.

Of general works dealing with creative life, Ribot's (119) "Essay on Creative Imagination" has been too often reviewed to need comment. His analysis in the psychological field has been hitherto the most complete. But it makes the mistake of supposing that creative thought is largely a matter of imagination instead of an integration of all the thought processes. Ribot divides creative imagination into types—plastic, diffluent, mystic, scientific, and practical. The classification, however, suffers from the same fault as that of Downey and Slosson (130) who divide creative imagination into prosaic, inventive, artistic, etc.; namely, it is based on social function, not upon any analysis of the process itself.

Graham Wallas, in his excellent little volume, "The Art of Thought" (146), has done more than almost any other writer to make clear the simpler processes of the creative mind. He distinguishes four stages of thought—preparation, incubation, illumination, and verification. His discussion is, however, too slight to do more than point directions.

A little more complete is Spearman's (134) treatment of the creative mind. It deals briefly with principles of knowledge and their application to the arts. The book is partly an aesthetics and partly a theory of creative insight based on what is called "educing a correlate," *i.e.,* by analogy and proportion. He claims the identity of the creative process in whatever manifestation—artistic, literary, scien-

tific, etc. The book, like Wallas', is too casual and slight, however, to be more than the foundation for later research.

Popular discussions of the significance of creative thought are Rollo Walter Brown (**18**), dealing particularly with literature and the arts in America, and Oliver M. Sayler's (**125**) study of the creation, distribution and appreciation of art in America. Revolt in the arts, though always interesting to the proponents, is not always creative. According to Sayler, the immediate problem before modern artists is that of withstanding the pressure of the machine age. The latter half of the book contributes thirty-six articles by authorities in the several arts. There is a certain sterility in their approach, however, which leads to no psychological advance.

Popularly, again, Casson (**24**) has written a little book on the value and social function of creative thinkers. Holmes (**60**) and Walker (**145**) apply creative thinking to business needs, and office routine. Follet (**48**), has applied to the social sciences her conception of creative experience.

The measurement of creative ability, unlike that of most special aptitudes, has been largely neglected. Cleeton (**26**) tries to straighten out the confusion existing between such traits as independence, initiative and ingenuity. He finds the reliability coefficients for ratings on the trait *originality* unfavorable when compared with those of more objective traits. The short bibliography which he appends is useful in combing originality from the fields of business, salesmanship, and mental testing.

In general one of the most suggestive discussions is that of Fröbes (**49**) dealing with the elements of creative activity, the process of creation, the development of creative imagination, the types of creative ability, and the fields affected by creative effort. His discussion, though incidental to a larger work, includes abundant illustrative material, and a résumé of the German schools of thought on the subject.

Most of these general discussions are disappointing. For more rewarding materials one must turn not to general works, but to special fields, such as the production of poetry, the methods of artistic and musical creation, and invention in science. Unlimited material can be found of a biographical and historical nature. We shall give here only a few of the more recent and significant references in each field.

Literary Creation

Piercy (**111**) has compiled a volume "wherein the eighty-five modern English and American writers whose works are represented,

reveal, by letters to the author and other significant means, the actual processes of their craft." The book contains letters from such men as John Galsworthy, Ernest Hemingway, Hugh Walpole, Louis Bromfield, Sheila Kaye-Smith. It offers selections from formal and informal essayists, humorists, short story writers, letters from authors, extracts from authors' expository writings on their profession, facsimiles of revised manuscript pages, etc.

Wildman (**151**) has a chapter (XV) on "How they write their fiction," which is the result of a questionnaire sent widely to writers. Hoffman (**58, 59**) has written two books on the technique of literary production, while Wilkinson (**152**) has a very valuable collection of references and quotations from literary creators. Goodman (**51**), Brown (**19**), Warren (**147**) and an editorial in the "Bookman"(**8**) deal in a popular way with the working habits of authors and give instructions for those who aspire to that art.

In the new German literary criticism is to be found by far the most vital discussion of the forces which make for literary achievement. Theodore Geissendoefer (**50**) has compiled an excellent critical bibliography of recent methods of German literary research. He points out the changes in German literary history from 1900 to 1910 which opposed the older positivistic, or Scherer, school, and established the idealistic. The new movement is the work and influence of Wilhelm Dilthey (**33, 35, 36**) "who objected to the transference of the methods and concepts of the natural sciences to the mental sciences." (Geissendoefer, p. 391). Out of this objection have grown several schools of literary interpretation having for their purpose the explanation of the creative ability and genius. The Ethnological School—Nadler (**96, 97, 98**)—sees in the racial groups the creative forces in literature. "Individual authors are merely the spokesmen through whom the groups become articulate." (Ibid., p. 393.)

Associated with the ethnological school and analogous to it is another which founds creative accomplishment and literary achievement on racial heredity. "Its adherents cherish a pronounced hero-worship or cult in the manner of Carlyle or an Emerson or a Nietzsche." (Ibid., p. 395; Bartels, **12**.) The "Volk" school closely relates itself to these movements. "For the more radical exponents of the 'Volk' theory, the individuality of a writer is completely submerged in the individuality of the personified 'Volkstum'"; (ibid., p. 395) *it* is the creative force and not the individual, because the indi-

vidual that obeys the laws inherent in himself does not exist; he is a mere fiction.

In addition there are other special approaches to the problem of literary production and genius: the Sociological School, the tendency to enhance German Civilization (Die Kulturkundliche Richtung). Of more importance for psychologists are the types of literary investigation based on, or embodying, the *Strukturpsychologie* first propounded by Dilthey (**34**), and developed later by Eduard Spranger (**135**). The attempt of the older psychology was, of course, to break up consciousness into hypothetical elements; the purpose of the newer, or *geistwissenschaftliche,* is to supply an integrating force for these elements by discovering basic types of personality by means of an analysis of the whole person. Literary investigation in Germany has been powerfully influenced by the *Entwicklungspsychologie,* and the *Gestalt psychologie,* by psychoanalysis, *Charakterologie,* and by Dessoir's psychology of art. To give a complete bibliography is impossible. The chief contributors have been Spranger (**136**), Müller-Freienfels (**90, 91**), Werner (**150**). Dilthey's conception of types is transferred to the field of art by Nohl (**100, 101, 102**), to literature by Unger (**144**), and to art by Müller-Freienfels (**92, 93**). A detailed analysis of this material and of other attempts to explain creative accomplishment in terms of Form or Style, Idea-Content or "personal idiom," as described by Roback (**122**), will be found in Geissendoefer's bibliography from which I have borrowed freely.

Poetry has trailing behind it an enormous literature which bears indirectly on the creative accomplishments of the author. Prescott's Poetic Mind (**114**) makes poetic composition synonymous with dream or unconscious thinking. The book is valuable, if not for the reliability of its theory, at least for the abundant illustrative material which it contains. Hale (**54**), Boas (**14**), Brown (**20**), and Rankin (**116**) have been duplicating in English some of the approaches to the study of creative life which, as seen above, have been current in Germany. Russell (**124**), in dealing with the poets' emotions, Alden (**2**), on poetic imagination, Krutch (**68**) on Poe, and Carpenter and Barnefield (**22**) on Shelley, have furnished special studies in the field. Amy Lowell in *Poetry and Poets* (**78**), and *John Keats* (**77**), has done penetrating work, both general and biographical, on the creative process. The one great and outstanding contribution is, of course, J. L. Lowes' "The Road to Xanadu" (**79**), on the creative mind of Coleridge—a most careful, searching, scholarly

contribution to a field which needs just that. While Lowes draws few generalizations, his illustrative material is superb.

Snyder (131) has published a stimulating book on creation which may have a far-reaching influence on poetic criticism. It discusses hypnotic poetry, presenting the thesis that certain types of poetry are spell-weaving, that is, actually hypnotic in influence on the hearer, while other types are purely intellectual. He further emphasizes the fact that poetic *inspiration*, in its intense concentration upon the main theme of the work, involves sometimes a slight degree of dissociation, if not actual auto-hypnosis. In addition, the emotional excitement, the unhampered free association often produces incoherent and unneeded ideas. Creative work done under experimental hypnosis illuminates many of the obscure mechanisms of the creative process.

Richards (120) has for some time been a powerful influence in the literary field. His work on the principles of criticism, while in part an aesthetics of literature dealing with the familiar problems of communication, art and morals, rhythm and meter, the psychology of memory, emotion, and imagination, etc., is also a treatise on the creative spirit of the artist, his normality, attitudes, and methods of objectifying conceptions. See also Lewisohn (75), Brandes (16), and Troward (142). Nixon (99) gives a long and useful bibliography of the psycho-literary field, especially the journal articles.

Intuition

Intuition might be expected to add to an understanding of the creative process. But the subject has recently received but slight discussion in psychological literature—only six articles appearing in the journals last year. Qualitatively these contribute little to the comprehension of creative technique. Wendell (148, 149) has written on the literature of ecstasy and the erotic motive in literature. Flournoy (47) has described a modern mystic, and Morel (87) has made an analysis of mystical introversion. Allport (6) argues that personality must be studied by the intuitive method which focuses psychology (which hitherto has neglected this particular aspect of its subject matter) upon the *unities* of its subject. Intuitionism which denies the obvious rule of inference based on previous experience in character judging is unpsychological. Unity as well as differentiation is the aim of psychological process. (See also Roback, 122.)

Although it is clear that at times creative thought does border on mysticism and that the states of slight dissociation, in which brilliant ideas, "hunches," and unexpected solutions to problems appear, have no poetic significance, it is difficult to draw from pure mysticism

more than a general description of the stages of creative work. The phases of the creative experience—Preparation, Incubation, Inspiration, and Elaboration—are remarkably similar to the meditation, contemplation, ecstasy, and fulfilment of the mystic. In fact the key to mysticism lies somewhere in the processes of creative thought. It is easier, however, to interpret mysticism according to the formula for creative accomplishment, than to decipher the process of creation from masses of mystical introspection and self-analysis. We cannot here enter upon a discussion of mysticism. Several books will serve as excellent contributions in the field—Jones (**63, 64**), Herman (**57**), Flewelling (**46**), Raymond (**117**).

Science and Invention

The creative process, as seen in the history and development of invention, deserves far more psychological analysis than it has received. Most work has been in the history of science rather than in psychology. Two articles only were chronicled in the Psychological Abstracts in 1930—both from anthropologists. Nordenskjöld (**103**) mentions a large number of inventions and discoveries of both pre-Columbian and post-Columbian Indians which were unknown to the Old World. He points out that a culture loan is more complicated than one may think—a field needing investigation. Jefferson (**62**) has sketched the geographical distribution of inventiveness and Harrison (**55**) has written on opportunism and the factor of invention. It is generally accepted that inventions have progressed by summations of small changes. He develops the opportunist view of Pitt-Rivers, which, denying originality to the human species, ascribes the independent evolution of similar artifacts to the coincidence of objective factors. Neither of these studies elaborates the process of thought in the mind of the inventor. But the literature on diffusion and independent invention is too extensive to warrant further consideration here.

The best bibliography of inventiveness and inventors is that of Severenance (**127**). This comprises a list of the most important biographical and historical studies, but adds little on the psychological side, perhaps because there is practically no outstanding literature on the subject outside of the article by Royce (**123**) and the little book by Paulhan (**108**).

The sociologists have added more. Ogburn and Thomas (**104**) discuss the inevitability of invention. They offer a list of 148 inventions and discoveries each of which was discovered by two or more

people simultaneously. They postulate two factors which determine creative output: (1) The distribution of mental ability and (2) the existing status of culture. Epstein (**44**) in a thorough and enlightening article has discussed the question of whether industrial inventions are the result of systematic or heroic conditions. Ogburn (**105**) has given a list of simultaneous inventions and discoveries with interpretative sketches. Pupin (**115**) discusses popularly the phases of scientific creative life.

The historians Ellis (**43**), Bakewell (**11**), Figuier (**45**), Libby (**76**), and Isles (**61**) have dealt with American Invention and Discovery in the 19th and 20th centuries. A romantic spirit often creeps into their accounts. Lansing (**70**) in "Great Moments in Science," Cochrane (**27**) in "The Romance of Industry and Invention," and Darrow (**28**) in "Masters of Science and Invention"—all show this romancing, hero-worshipping attitude. Dyer (**41**) in his work on Edison, however, gives a critical biographical study of the creative methods of that genius. The creative impulse in industry needs more studies such as Dyer's and Marot's (**82**).

Other thinkers, the anthropologists especially, have handled the problem, usually with emphasis on the diffusion of inventions throughout a culture. Steward (**138**) is an example in point. For special aspects of the problem see Slosson (**129**), Butterworth (**21**), Thompson (**141**), Mayer (**84**). It is unfortunate that the psychologists cannot claim more significant contributions in this province.

Genius

What has been true of these diverse fields is true also of the work on genius and its relation to the study of creative thought. More strict psychologizing here, perhaps, but with uncertain result! Most articles deal with birth-month, character, early appearance, degeneration, detection, emotions, heredity, rather than creative methods. That there are common elements in all types of creative work seems clear; but they remain to be defined. Typical studies, however, are Hartlaub (**56**), Del Greco (**29**), Tucker (**143**), Kretschmer (**66**), Sfrondrini (**128**). Kretschmer's (**67**) comments on heredity and environmental factors as the reason for the creative achievements of genius show that an hereditary relationship exists between gifted individuals in general. A sharply defined talent-class is also produced by clan and family breeding, genius being due to cross breeding between different peoples, tribes, etc. The view is supported by an anonymous article in *Engineering News* (**7**) where Edison's attempt to find

genius by examinations is claimed a failure, and Garvan's attempt to find a superchemist by a score card rating creative ability is thought laudable, but over-refined. Heredity—whatever that may be—and background, play so large a part that it is difficult to discover genius, say nothing of predicting its arrival.

The best and most thorough recent work on genius has been done by Terman and his helpers (139, 140). Here all aspects of the subject, except the creative process itself, are dealt with quantitatively and statistically. Popular interest has turned rather upon the abnormalities of genius. Leonard (72), Séailles (126), Lavrin (71), and the Encyclopedia Britannica (42) all offer material upon such abnormalities, or else upon the peculiar creative talents of genius. The psychoanalysts have thrown up a smoke screen under cover of which they are speculating in safety.

Plaut's (112) valuable contribution dealing in a large way with the problem of genius, the productive personality, with self-portraits and accounts by creative thinkers, is perhaps the most thorough biographical approach to the study of creative personality which the field has yet produced. See also Ludwig (80).

Aesthetics

Aesthetics has some recent notable contributions. Hebarline (53), Ducasse (40), Parkhurst (107), Prall (113), Grudin (52) have written books on general aesthetics each with contributions on creative accomplishment. Parkhurst, especially, has some excellent speculative essays with good illustrative material on the nature of creative and appreciative impulses. Oppenheimer (106) deals specifically with the nature of the artistic impulse, Kuhr (69) has related the aesthetic experience to what he calls aesthetic creation, *i.e.*, the constructive side of aesthetic contemplation; and Paulsson (109) has charted the creative element in art. But these contributions are only directive. Although aesthetics is overcoming its formlessness, it is not growing more profitably experimental.

Imagination and Dissociation

Suffice it to say that the experimental and introspective attempts to divide creative thinkers into groups according to the type of their imagination—the predominance of one or the other forms of sensory imagery—is an inadequate approach to the technique of creative thought. There is a large literature, perhaps more extended than any field thus far mentioned, but it is sterile. It has not been proved that creative thinkers conform to any special type—*e.g.*, artists to visual

imagery, musicians to auditory. For the best recent portrayal of this thesis see Downey (38). The volume, especially in Books II and VI, deals fully with imaginal experience as related to literature. It offers a more valuable contribution to the psychology of the reader than to the psychology of the creator of literature.

Creative imagination has an immense background among the older philosophers and critics. But the material is found less frequently in connection with the word "imagination," or the phrase "creative imagination" (which does not appear before the middle of the 18th century) than in connection with such words as "wit," "conceit," "fiction," etc. The important passages of Aristotle, for instance, are found not in the sections of the Psychology where he deals with *phantasia,* but in the *Poetics* where he treats of representative fiction, the art of developing a plot so as to give "the illusion of higher reality." And this still more is found in the "genius" books of the English 18th or early 19th century (reflected in Kant's Critique of Aesthetic Judgment, the later attempts of Wordsworth and Coleridge to distinguish between fancy and imagination).

Nor can one follow altogether the attempts to reduce inspired art and literature and even religion to auto-hypnosis and automatisms of the unconscious. Leuba (73, 74) and Carpenter (23). This theory may apply well enough to the types of imagination that have developed in connection with emotional romanticism (Byron) during the past century. It seems less easy of application to a deliberative dramatist like Sophocles whose creative effort is associated with a patient and penetrating observation of human nature. After all, the essential difficulty is not to create but to give human relevancy to one's creation.

Other References

Mention will be made of only the most scattered material. Delacroix (30) has written on the psychology of art; Souriau (132) on suggestion in art; Arréat (9) on the psychology of painting. Mason (83) attempts essays on spontaniety, workmanship and originality largely from the musical point of view. D'Indy (37) describes the course of musical composition, and Souriau (133) deals with the imagination of the artist. Agnew has compared musicians in regard to their auditory imagery. Boisboudrain (15) discusses the education of the pictorial memory and the formation of the artist.

Psychoanalytic contributions are often relevant. Phantasies of poets offer the psychoanalyst fertile fields for unearthing the dynamics of poetical creation. The best work in this field is

Stekel (137) on the dreams of poets and neurotics. His chapters on the foundation of poetic creation (III) hold that the destructive and the creative forces in the individual are correlative. The two drives are simply different poles of the same motive. There is no monopolarity in psychic existence. He who creates a new world, destroys with it an old one. Nietzsche likened himself to a hand laborer who with a hammer destroyed the old and also shaped the new. Muschg (95) argues that a great author must have an acquaintance with the mechanism of the unconscious. The true recognition of conflict, repression and sublimation is the contribution of psychoanalysis alone. See also Reik (118) and De Busscher (32).

The Direction of Research

Success in research on the problems of creative thinking will lie, it seems, in the following directions.

First, in comparative studies of the various types of creative thinkers with a view to determining the uniformities that may exist. These will probably be greater than one expects. If a recent questionnaire sent out by the Educational Department of the American Chemical Society (not yet published) is any criterion, scientists are more like artists in their insights, "hunches" and flashes of genius, than popular opinion would suppose. We need to know more about types, if there are any. We need to describe more carefully the range from the logical, deliberative, consciously progressive thinkers at one end of the scale, to the inspired, emotional, spontaneous, "lyric" thinkers at the other end. Creative thought can apparently originate at any level of consciousness. Only by close biographical and introspective work can distinctions be made in this field, or men located within this framework.

Second, we need to define the periods in the development of a creative work, the period of *incubation* with its ingathering of materials, its ill-defined, restless impulse to create, which gradually, through a series of thwarted attempts at production, becomes more intense and explicit; the period of *inspiration,* in which some happy accident, or unusual combination of ideas furnishes the direction and point of origin for more rewarding work. The flood of ideas, the emotionality, the key idea or thesis, the fleeting nature of conceptions, all these contribute a certain exhilaration to the "moment of inspiration." And then the period of *verification,* or *elaboration,* in which the outline of the proposed work already indicated in the moment of illumination, is laboriously completed and criticized. Here also are

exercised all the special techniques, rules of procedure, and methods required by the art or science employed. We need to draw more sharply the outlines of these periods, and sketch in the background.

Third, success in research will come if we can study more completely, either in animals or in men, the mental processes involved in *insight*. Some creative thinkers set their problems firmly in consciousness by hard, systematic effort, and then turn freely to other matters. Sometime during the period of undirected thought and relaxation, usually in a moment of sudden distraction or diversion of interest by irrelevant events or ideas, the looked-for answer, the desired solution comes to them. From then on, elaboration takes place fluently. Secondary inspirations dealing with the details of the whole give rise to fresh releases of energy and new enthusiasms. Here, on this experience is one focus of the problem of constructive thought. It would seem that the period of free thinking that so often intervenes between the establishment of the problem in consciousness and the sudden appearance of its solution may be disintegrative as well as integrative, ending either in unproductive reverie and day-dreaming, or in some new fetch of the imagination. What determines the result? Clearly the period of preparation that precedes the illumination, the effort to entrench the creative purpose. Creative ideas are at times dependent upon the whim of free, unhampered thought, and the accident of distraction. But they are always linked with a strong creative urge, a problem firmly set in mind. Biographical confirmation of the sort Lowes and Lowell have so carefully furnished would help greatly in clearing the ground around these problems. Analytic studies of the mystics, the poets, the researchers and inventors, as to the sources of their material, would add breadth to the psychological analyses that have already been made.

Fourth, evidence is needed on a number of special aspects of the creative experience. For example, the intellectual activities of the thinker during the period of incubation, the extent of voluntary control of ideas, the stimuli for the commencement of creative work, the criteria of selection of ideas, the characteristics of the moment of inspiration, and the conditions of its appearance.

Fifth, we should have more *experimental* evidence on the nature of the creative process. This is not altogether unavailable. It is possible to experiment with dissociated states of consciousness and thus to duplicate some of the experiences of normal creative thought. For instance, by post-hypnotic suggestion periods of inspiration can be conditioned which are introspectively the equivalent of the normal

thing. Mearns (**85, 86**) in his books on creative power has given results of his experimentation with creativity in children. It would be desirable to have experimental verification of the generalizations obtained through comparative biographical studies.

Conclusion

In the present condition of knowledge the technique of creative thought is either an inaccessible field for research, or else is an area that must be restaked and reclaimed by appropriating corners of adjacent fields. Literature dealing directly with the problem is largely lacking; but there is a mass of adjuvant material from other fields. Scattered, anecdotal, general, this literature is of little value in a systematic approach to the problem. But some progress can be made, especially on the experimental side with work on types of imagination, dissociation, etc. Even so the problem remains largely an introspective, critical, and interpretative one. When the technique of creative thinking is understood, it will be propaedeutic to new advances in education, general psychological theory, and the cultivation of talent. Hardly anyone has as yet made a direct impression in the field.

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NOTES AND NEWS

FORMAL dedication of the Institute of Human Relations of Yale University took place on May 9. Speakers were President Angell, Governor Cross, Secretary of the Interior Ray Lyman Wilbur, and George E. Vincent, former president of the Rockefeller Foundation.

PROFESSOR GEORGE HERBERT MEAD, for many years professor of philosophy in the University of Chicago, has died at the age of sixty-eight years.

AT the annual meeting in April of the National Academy of Sciences Dr. Margaret Floy Washburn was elected to membership in that body.

PROFESSOR EDWARD SCRIBNER AMES has been appointed chairman of the Department of Philosophy at the University of Chicago.

COLONEL WOODCOCK, Director of Prohibition, has appointed Professor Walter R. Miles a member of the Prohibition Bureau's Advisory Research Council. This Council is constituted of a group of ten individuals, mostly drawn from the fields of sociology and economics, and has been formed to suggest lines of research and methodology for securing information about alcohol and the operation of the Eighteenth Amendment.

PROFESSOR IDA SMOOT DUSENBERRY, a sister of Senator Smoot, of the Department of Psychology, Brigham Young University, is on sabbatical leave, and has been fulfilling her appointment as a member of the staff of the University Afloat. She expects to spend the coming summer quarter in study at the University of Chicago.

DR. G. LAVERNE FREEMAN, Ph.D., Cornell, 1929, has been appointed an instructor in psychology at Northwestern. Dr. Freeman has been a National Research Fellow at Yale for the past two years.

PROFESSOR S. N. STEVENS, assistant professor of psychology at Northwestern, has been appointed assistant dean in charge of Liberal Arts courses on the Chicago Campus. Professor Stevens will continue his work in the psychology department.

THE *Daily Press* announces that President Hoover has created a Council of Personnel Administration. The President designated the heads of various government departments as members of the Council and made provisions for committees of business, industrial and educational leaders to assist in making available to the government the best personnel practices of industries. Among the members of these committees are Dr. W. V. Brigham, director of the Personnel Research Federation, and Professor Edward L. Thorndike of Teachers College, Columbia University.

AT Smith College Miss Marthe Sturm, Lic. ès L., Diplôme d'Études Supérieures, has been promoted from an assistant professorship to an associate professorship; Miss Hanna Fay Faterson, Ph.D., has been promoted from an instructorship to an assistant professorship; Miss Elsa Margareeta Siipola, A.B., and Miss Elsa Anna Rendahl, A.M., have been promoted from assistantships to instructorships. Professor David Camp Rogers will be on Sabbatical leave next year.

PROFESSOR CARL SPEARMAN, of the University of London, will conduct a seminar and offer a course in theory during the summer quarter in the Department of Psychology, at the Ohio State University.

DR. MARION S. TRABUE has obtained leave of absence from the University of North Carolina to accept appointment as Research Professor of Psychology in the Institute of Employment Stabilization Research at the University of Minnesota.

THE following have signified their intention of attending the 7-m Conference Internationale de Psychotechnique, September 6–11, at Moscow: Harry Dexter Kitson, Columbia University; Morris S. Viteles, University of Pennsylvania; Douglas Fryer, New York University; Lorine Pruette, New York City. The President of the Congress is I. Spielrein and the Secretary-General, J. M. Lahy.

MISS MARTHA POLLOCK has been appointed Psychologist in the Bradley Memorial Hospital of Providence. This hospital is devoted to the investigation and treatment of nervous diseases and behavior

problems of children. Miss Pollock will next year offer courses in Clinical Psychology at Brown University.

DR. WALTER R. MILES of Stanford University has been appointed Professor of Psychology in Yale University and Dr. Catherine Cox Miles has been appointed Clinical Professor of Psychology in the same University. Mr. and Mrs. Miles will return to Stanford University for the year 1931–32. They will take up permanent residence at Yale in the fall of 1932.

DR. ARTHUR H. RUGGLES, A.B., Dartmouth, M.D., Harvard, Sc.D., Dartmouth and Brown, Superintendent of the Butler and Bradley Hospitals, Providence, Consultant in Mental Hygiene, Yale University, Chairman of the Executive Committee, National Society of Mental Hygiene, and late Chief Psychiatrist, Second Division, U. S. Army, A.E.F., is now serving as Lecturer in Abnormal Psychology in Brown University.

THE Laboratory of Psychology in Brown University has recently been enlarged by the addition of a second building to be used exclusively for the purposes of investigation in Psychology. The new building is devoted solely to experimentation in animal psychology.

THE Department of Psychology in Brown University is to be allowed to use the facilities of the laboratory of clinical psychology in the Bradley Memorial Hospital, a new and unique institution recently opened in Providence, which is to be devoted to research in the causes of mental and nervous diseases and behavior problems in children. This new institution, which has been established under a large endowment, is said to be the only one of its kind in the world.

MR. LESTER F. BECK, A.B. and A.M., University of Oregon, has been appointed Fellow in Psychology at Brown University for the year 1931–32.

MR. ROBERT N. SANGFORD, A.B., University of Richmond, A.M., Columbia University, has been appointed Graduate Assistant in Psychology at Brown University for the year 1931–32.

MR. KARL SMITH, A.B., Miami University, 1931, has been appointed Graduate Assistant in Psychology at Brown University for the year 1931–32.

MISS MARGARET KELLER, A.B., Purdue University, 1931, has been appointed Graduate Assistant in Psychology at Brown University for the year 1931–32.

MR. ALFRED LINCOLN, A.B., Wesleyan University, 1931, has been appointed Junior Assistant in Psychology at Brown University for the year 1931–32.